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PREDICTIONS OF HUMAN TOLERANCE TO HEAT STRESS WHILE WEARING ADVANCED INTEGRATED SUIT CONCEPTS DURING SIMULATED REALISTIC COMBAT SCENARIOS

Barry S. Shender, Ph.D.
Air Vehicle and Crew Systems Technology Department (Code 6023)
NAVAL AIR WARFARE CENTER
AIRCRAFT DIVISION WARMINSTER
P.O. Box 5152
Warminster, PA 18974-0591

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BARRY S. SHENDER, Ph.D.

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Aircrew garment ensembles with increased body surface coverage designed to enhance G-tolerance were modelled to determine their effects on thermal loading during simulated realistic combat scenarios. Heat stress is known to decrease G-tolerance. Physiologic responses were estimated using the Texas Human Thermal Model (THTM). Predictions included rectal and mean skin temperatures, heart rate, sweat rate and accumulated sweat (SWT) during an "alert 5" with aerial combat maneuvers and normal operations with/without ACM. Five ensembles were modelled: USN winter ensemble with (WE) or without an EAGLE with a USN COMBAT EDGE (CE) counter pressure jerkin and a USN summer ensemble with CE and either an EAGLE (E), ATAGS (A) or ATAGS with additional arm coverage (AA). Simulations were run under cool, warm and hot conditions. Since no fluid intake was allowed during these simulations, SWT provided an estimate of dehydration. The hot "alert 5" scenario was the most thermally stressful due to the waiting period on the flight line without cooling. Reduced G-tolerance was predicted prior to simulated engagements with degraded CNS function for WE, A and AA. Similar CNS function deficits were not predicted for other scenarios. Few statistical differences were found during warm conditions for any scenario. Overall, E was predicted to produce a relatively lower thermal load than the other summer ensembles. External cooling should be provided during hot "alert 5" conditions to avoid negating the enhanced G-tolerance benefits obtained from wearing increased coverage anti-G suits.

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BARRY S. SHENDER, Ph.D.

NAVAL AIR WARFARE CENTER AIRCRAFT DIVISION WARMINSTER
AIR VEHICLE AND CREW SYSTEMS TECHNOLOGY DEPARTMENT
CODE 6023
WARMINSTER, PA 18974-0591

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INTRODUCTION

It has been shown that G-tolerance decreases as body core temperature rises (2). New concepts for aircrew integrated protective garments include additional clothing layers, some of which are impermeable to water and air, which can lead to increased thermal load. The optimal garment ensemble must balance the need for acceleration, altitude and chemical/biological agent protection while maintaining a tolerable thermal load during flight operations. To address this problem, realistic simulated high performance aircraft flight scenarios have been developed to estimate physiologic responses using the Texas Human Thermal Model (THTM) (8). This document reports on the THTM predictions of rectal (T_{re}) and skin temperatures in °C (T_{sk}), heart rate (HR, beats/min), sweat rate (SR, kg/hr) and accumulated sweat (SWT, kg) during three realistic combat scenarios: (1) alert 5 with aerial combat maneuvers (ACM); (2) normal operations with ACM; and (3) normal operations. Each scenario included the predicted responses of a male wearing either a winter ensemble with or without an EAGLE (Enhanced Anti-G Lower Ensemble) with a US Navy COMBAT EDGE (CE) counter pressure jerkin or a summer ensemble with a CE jerkin and EAGLE or ATAGS (Advanced Technology Anti-G Suit). Simulations were run under cool, warm and hot conditions.

METHODS

A description of the three flight scenarios is given in Table 1a. Table 1b contains the dry bulb temperatures (T_{db}), dewpoint temperatures (T_{dew}), black globe temperatures (T_{bg}) and relative humidities (RH) used during these simulations.

Each of the scenarios had certain commonalties. The environmental conditions of the briefing/debriefing room were the same. These were T_{db} = 70°F, T_{dew} = 47.6°F, T_{bg} = 70°F, black globe diameter = 6 inches (under all conditions throughout the study), RH = 45% and airspeed = 1.14 mph. These values were based on MIL-STD-1472D specifications (10). Note that these values were similar to those recorded in the Naval Air Warfare Center Aircraft Division Warminster (NAWC) dynamic flight simulator ready room. Each scenario began with a briefing and flight planning session (60 min), followed by a 90 min wait prior to launch for the aircrew and ground crew to get ready. Twenty minutes were then allotted for a pre-flight aircraft inspection. For each scenario, it took 30 min to return to the landing area, 20 min to secure and perform a post-flight aircraft inspection, followed by a 60 min debriefing. For the alert 5 scenario, the maximum time on the flight line was 55 min, without cooling, engines off and with the canopy open. Once the order to take-off was received, the aircraft leaves the landing area within 5 min. At this point, the engines were turned on and canopy was closed (this sequence was obtained by consensus of operational experience). Five minutes were allotted during the

alert 5 scenario to fly to the area and ten minutes to perform three ACM prior to the return flight. For the normal operations scenarios, the simulated pilot returned to the briefing room for 25 min after inspecting the aircraft. Prior to take-off, five min with the canopy closed were allotted to account for the increase in temperature which occurs before the aircraft environmental control system stabilizes (5). 30 min was allotted for the initial flight and the time to fly to the area. The aircraft was then on station for 60 min, followed by 10 min of ACM during the normal operations with ACM (70 min for the normal operations).

On July 20, 1993, T_{db}, T_{wb} (wet bulb) and T_{bg} (black globe diameter = 6 inches) were recorded using two WIBGET #RSS-214 multi-thermometers (Reuter-Stokes, Canada) and airspeed with a hand-held anemometer outside of and at calf and head level inside the rear cockpit of a NAWC high performance fighter aircraft. The timing of an alert 5 scenario was simulated. The canopy was open without cooling and with the engines off for 55 minutes. Measurements were recorded every 5 minutes. The engines were then turned on and the canopy closed. Recordings were then taken every minute for 11 min. The cockpit temperatures reached relatively constant levels after 5 min. Mean values are given in Table 2. These values were used to scale the cockpit conditions relative to the outside environment, as detailed below.

ACTIVITY	ALERT 5 w/ACM		NORMAL OPS w/ACM		NORMAL OPS	
	Interval Time	Time Elapsed	Interval Time	Time Elapsed	Interval Time	Time Elapsed
Brief / flight plan	60	60	60	60	60	60
Brief to launch	90	150	90	150	90	150
Inspect aircraft	20	170	20	170	20	170
Wait to launch - open canopy			25	195	25	195
Alert status - open canopy	55	225				
Alert status - closed canopy	5	230				
Close canopy for launch			5	200	5	200
Initial flight			15	215	15	215
Flight to area	5	235	15	230	15	230
On station			60	290	70	300
ACM #1	2	237	2	292		
Regroup #1	2	239	2	294		
ACM #2	2	241	2	296		
Regroup #2	2	243	2	298		
ACM #3	2	245	2	300		
Return to base	30	275	30	330	30	330
Secure / inspect aircraft	20	295	20	350	20	350
Debrief	60	355	60	410	60	410

Table 1a. Description of time (minutes) sequence for flight simulation scenarios. Time elapsed refers to the amount of time passed (minutes) during the simulation by the end of the indicated phase in the scenario.

ACTIVITY / LOCATION	COOL				WARM				HOT			
	T_{db}	T_{dew}	T_{bg}	RH	T_{db}	T_{dew}	T_{bg}	RH	T_{db}	T_{dew}	T_{bg}	RH
Briefing room	70	47.6	70	45	70	47.6	70	45	70	47.6	70	45
A/C inspect	40	27.0	40	60	84	57.1	84	40	102	86.1	102	61
wait to launch	70	47.6	70	45	70	47.6	70	45	70	47.6	70	45
open canopy	45	29.6	45	55	87	56.1	87	35	105	85.2	105	54
closed canopy	50	18.5	50	29	92	47.7	92	22	111	71.1	111	28
In flight	60*	28.9	64.4	31	75*	42.2	82.4	31	82*	48.6	91.4	31

Table 1b. Temperatures and relative humidities during flight simulation scenarios.
* = mean T_{db} in cockpit during flight.

Parameters for hot scenarios were based on temperatures recorded in the Persian Gulf by Banta, et al (1): T_{db} = 101.9°F, T_{dew} = 86.1°F, T_{bg} = 101.9°F and RH = 61%. These values were used during simulated aircraft inspection periods. Noting that the values in Table 2 indicated that the cockpit temperatures were 3% higher and the humidity was 7% lower than outside and using Banta's data as a baseline, simulated open cockpit T_{db} = 105°F, T_{dew} = 85.2°F, T_{bg} = 105°F, RH = 54%. It took about 4-5 minutes for ECS to bring temperatures to a stable level as shown in Table 2. During this period, T_{db} rose by 6% and the humidity fell by 48% relative to open cockpit values. Based on Banta's measurements, closed cockpit T_{db} = 111.3°F, T_{dew} = 71.1°F, T_{bg} = 111.3°F, RH = 28.1%. The simulated in-flight conditions were T_{db} = 82°F, T_{dew} = 48.6°F, T_{bg} = 91.4°F, RH = 31.3%. These values were obtained by consensus of operational experience. This information also indicated that temperatures were not uniform in the cockpit. THTM has provisions for specifying a temperature gradient (the parameter TGRAD). So using this information, T_{db} = 69°F for the torso, thighs and arms, T_{db} = 76°F for the head, T_{db} = 85°F for the calves (mean difference between thigh and foot temperatures) and T_{db} = 101°F for the feet. Humidity was based on the values recorded in NAWC aircraft (42% lower that open cockpit conditions). T_{bg} was derived from data reported by Nunneley from F-4E flights in Florida (5).

Cool and warm scenario environmental conditions were based on MIL-STD-210C (9). Mean cockpit temperatures and cockpit temperature gradients, were scaled in a similar fashion as shown above based on the values listed in Table 2 (see Table 1b). For the cockpit temperatures gradients, mean temperatures of 60 and 75°F were used, for the cool and warm scenarios, respectively.

Outdoor airspeed was estimated as the average cruising speed of an aircraft carrier during flight operations (15 - 30 knots) and was set at 25.9 mph. This was based on consensus of operational experience. Airspeed in the cockpit was determined based on NAWC measurements (Table 2). Cockpit airspeed was reduced by 50% relative to anemometer readings taken next to the aircraft. Therefore, open cockpit airspeed = 12.9 mph. Airspeed within the cockpit was set to the average value recorded in the NAWC aircraft, 4.4 mph. Note that in the cockpit, airflow was 8.9-11.2 mph at the calf, about 3.4 mph in the lap and 0 mph at the head.

Locations	Time	T_{wb} (°F)	T_{db} (°F)	T_{bg} (°F)	Airspeed (mph)	RH (%)
Outside	pre-A5	73.6	84.3	98.3	4.0	60
Torso, canopy open	0 - 55 min	73.3 ± 0.2	87.0 ± 1.2	96.2 ± 3.2	2.5 ± 2.7	52.8 ± 2.8
Calf, canopy open	0 - 55 min	74.3 ± 0.8	87.9 ± 0.5	91.7 ± 2.4	2.5 ± 2.7	53.6 ± 3.1
Torso, canopy closed	0 - 4 min	65.6 ± 3.8	92.1 ± 3.1	110.4 ± 0.6	4.4 ± 5.1	23.6 ± 2.7
Calf, canopy closed	0 - 4 min	64.6 ± 2.3	87.6 ± 3.0	86.3 ± 5.3	4.4 ± 5.1	27.8 ± 3.0
Torso, canopy closed	5 - 11 min	61.8 ± 0.9	83.8 ± 1.1	101.9 ± 1.7	4.4 ± 5.1	26.0 ± 1.9
Calf, canopy closed	5 - 11 min	61.9 ± 0.5	79.8 ± 1.0	77.8 ± 0.5	4.4 ± 5.1	35.6 ± 2.7
Outside	post-A5	73.0	87.6	94.9	13.4	51

Table 2. Mean temperature and airspeed measurements recorded on July 20, 1993 in and around the rear cockpit of the NAWC high performance aircraft simulating an alert 5 (A5) scenario at the NAWC airfield. Pre and post-A5 are individual outside the aircraft recordings before and after the simulated A5. Cabin temperatures stabilized after 5 min with the ECS activated.

Aircraft altitudes were determined based on a consensus of operational experience and the corresponding cabin pressure schedule was taken from the NATOPS F-14A Flight Manual (11). Aircraft altitude during the initial flight was set to 22,500 ft (cabin altitude 8,000 ft, 10.91 torr), on station altitude = 25,000 ft (cabin altitude 9,000 ft, 10.50 torr) and an ACM altitude of 29,000 ft (cabin altitude 11,000 ft, 9.72 torr). Sea level pressure was 14.70 torr.

For all of the simulations, the estimated responses of a 160 lb human male with a mean skinfold thickness of 10 mm and a basal metabolic rate of 100 watts were calculated. Exercise metabolic rates (EMR) were chosen based upon a study by Nunneley and Stribley (4). While in the briefing room, EMR = 110 watts. During aircraft inspection periods, EMR = 175 watts and during initial flight and when on station, EMR = 130 watts. During ACM, EMR alternated between 260 watts (during ACM) and 175 watts (during regroup). THTM allowed for specification of the relative distribution of the EMR over various body segments. During briefing room periods and aircraft inspections, the distribution was: arms = 20%, legs = 50%, abdomen = 15% and chest = 15%. During flight, it was assumed that the upper body would perform more of the relative workload. The distribution during these periods was: arms = 30%, legs = 30%, abdomen = 15% and chest = 25%.

The garment configurations used were (garments listed are given in order from inner to outer layers):

1. **WC**: Winter control configuration: CWU-72/P anti-exposure liner, CWU-27/P flyers coverall, CWU-62/P anti-exposure coverall.
2. **WE**: Winter/EAGLE: CWU-72/P, EAGLE, CE jerkin, CWU-27/P, CWU-62/P.

3. **E**: EAGLE Summer: EAGLE, CE jerkin, CWU-27/P.

4. **A**: ATAGS Summer: ATAGS, CE jerkin, CWU-27/P.

5. **AA**: ATAGS Summer ensemble with additional arm coverage. Arm CLO and Im values were taken from an ILC Dover/META ensemble which included an ILC Dover partial pressure suit and a META immersion suit.

All configurations included an air crew helmet, GS/FRP-2 flight gloves, leather flight boots, wool socks and CWU-43/P and CWU-44/P thermal underwear.

CLO and Im data for fifteen body segments were measured using a thermal manikin dressed in these ensembles by Arthur D. Little, Inc. and are listed in Table 3.

Segment	Garment	CLO	Im	Garment	CLO	Im	Garment	CLO	Im
Head	WC	1.68	0.20	WE	1.71	0.23	E	1.63	0.21
Chest		4.35	0.31		4.32	0.22		3.47	0.26
Abdomen		4.13	0.38		4.11	0.30		3.04	0.35
Rt Biceps		2.89	0.27		2.96	0.33		2.16	0.35
Lt Biceps		2.60	0.28		2.72	0.31		2.04	0.39
Rt Forearm		2.57	0.22		2.53	0.25		2.35	0.32
Lt Forearm		2.09	0.25		2.06	0.23		1.94	0.34
Rt Hand		1.37	0.29		1.34	0.26		1.50	0.40
Lt Hand		1.41	0.31		1.40	0.27		1.40	0.35
Rt Thigh		2.96	0.39		3.14	0.25		2.59	0.36
Lt Thigh		2.22	0.35		2.62	0.27		2.03	0.32
Rt Leg		2.11	0.35		2.38	0.30		1.93	0.40
Lt Leg		2.65	0.42		3.10	0.31		2.32	0.45
Rt Foot		1.47	0.25		1.52	0.11		1.54	0.27
Lt Foot		1.42	0.26		1.52	0.10		1.49	0.27
Head	A	1.64	0.20	AA	1.64	0.20			
Chest		3.39	0.30		3.39	0.30			
Abdomen		2.97	0.40		2.97	0.40			
Rt Biceps		2.33	0.45		2.80	0.05			
Lt Biceps		2.12	0.39		2.51	0.05			
Rt Forearm		2.37	0.27		2.67	0.10			
Lt Forearm		1.97	0.25		2.21	0.07			
Rt Hand		1.30	0.33		1.30	0.33			
Lt Hand		1.48	0.38		1.48	0.38			
Rt Thigh		2.36	0.20		2.36	0.20			
Lt Thigh		1.91	0.22		1.91	0.22			
Rt Leg		2.07	0.10		2.07	0.10			
Lt Leg		2.86	0.10		2.86	0.10			
Rt Foot		1.06	0.18		1.06	0.18			
Lt Foot		1.05	0.16		1.05	0.16			

Table 3. CLO and Im values for five ensembles measured during thermal manikin testing.

Garment	Layer	Thick	XKI	RCTI	Mean PERM	SAT	XKSATI	RCSATI
E	1	0.087	0.20	40.0	0.37	10.0	0.3	40.0
	2	0.042	0.03	5.0	0.37	10.0	0.3	10.0
	3	0.015	0.019	3.3	0.37	13.0	0.2268	20.0
A & AA	1	0.087	0.20	40.0	0.29	10.0	0.3	40.0
	2	0.085	0.03	5.0	0.29	10.0	0.3	10.0
	3	0.015	0.019	3.3	0.29	13.0	0.2268	20.0
WC	1	0.087	0.20	40.0	0.39	10.0	0.3	40.0
	2	0.235	0.019	1.636	0.39	10.0	0.3	10.0
	3	0.027	0.12	30.0	0.39	13.0	0.21	30.0
WE	1	0.087	0.20	40.0	0.30	10.0	0.3	40.0
	2	0.235	0.019	1.636	0.30	10.0	0.3	10.0
	3	0.027	0.12	30.0	0.30	13.0	0.21	30.0

Table 4. Garment file parameters used in THTM.

In the Model, the garments were defined using the following parameters (see Table 4): number of layers (NGARM), emissivity of the outer surface (EMIS), number of node points per layer (NI), thickness in inches (THICK), thermal conductivity in BTU/hour·foot·°F (XKI), density-specific heat product in BTU/cubic foot·°F (RCTI), permeability for water vapor (PERM), saturated water content in pounds/cubic foot (SAT), thermal conductivity of fully saturated fabric in BTU/hour·foot·°F (XKSATI), and density-specific heat product of fully saturated fabric in BTU/cubic foot·°F (RCSATI).

THICK was measured at NAWC for each layer in each ensemble. Im values (Table 3) were used for PERM. Following the format used in THTM for garments including pneumatic bladders, Im values were specified for torso, thigh and calf segments and mean Im values were used for the other segments. Arm segment Im values for AA were also specified for PERM. WC did not have an anti-G suit so only the mean Im was used for PERM. All other parameters were based on values predefined in THTM.

All modelled ensembles consisted of three layers with two nodes per layer with EMIS = 0.95. The innermost layer was always the thermal underwear. XKI, RCTI, XKSATI and RCSATI values were taken from the predefined summer flight suit inner layer definition (SFLT) with SAT from the THTM's chemical defense garment (AFCD).

Parameters for the middle layer of the summer garments were based on the SFLT values, except for PERM and THICK. Values for the outer layer, which included the bladders, were taken from AFCD.

Values for the middle layer of the winter garments used SFLT values for SAT, XKSATI and RCSATI with XKI and RCTI from the inner layer of the THIN garment definition used by THTM for water immersion modelling (THIN corresponds to a Gore-Tex® garment). The second THIN layer values for XKI and RCTI were used for the

outermost layer. SAT and XKSATI values were taken from AFCD with RCSATI set equal to RCTI.

To account for body segments covered by bladders, the parameter COVER was set to YES (i.e., impermeable outer layer) for the torso, head and thigh for WE and E. Impermeable outer layers covered these segments plus the calves and feet for A. The rationale for this was to account for the additional knee and foot coverage provided by ATAGS. For AA, COVER was also set to YES for the biceps and forearms. COVER was set to NO for WC, except for the head.

Statistical tests (Number Cruncher Statistical System, version 5.0) included unpaired two-way t-tests (when variances were unequal) and general linear model ANOVA (when variances were equal). Comparisons of predicted T_{re}, T_{sk}, HR, SR and SWT were made between winter control and winter EAGLE configurations. The differences between all summer ensembles were also determined. Significance was set at the $p = 0.05$ level. All predicted parameter values are given in Appendix A.

RESULTS

An index of the decline in performance due to heat stress can be determined based on the drop in body weight due to dehydration. Since the modelled human had no water intake, weight loss was estimated from the amount of sweat lost during each scenario. Taliaferro, et al (6) found that acceleration tolerance decreased by 8% when subjects were 1% dehydrated and by 16% when they were 3% dehydrated. Whittingham (7) reported that a loss in body weight from 1 to 5% results in vague discomfort, impatience, nausea and a loss of efficiency. A loss between 6 to 10% produces dizziness, headache, dyspnea, decreased blood volume, increased blood concentration, cyanosis, absence of salivation, indistinct speech, tingling in the limbs and motor deficits. Deficits between 11 - 20% can lead to delirium, spasticity, loss of vision or even death. Based on the 160 lb (72.6 kg) man used in this simulation, accumulated sweat of 0.73 kg = 1% dehydration, 2.18 kg = 3% dehydration, 4.35 kg = 6% dehydration and 7.99 kg = 11% dehydration. Therefore, based on an example calculation by Whittingham, for the 160 lb man used in the simulation to remain effective, his overall fluid losses should not exceed 4.5 kg. Table 5 presents the time to these levels as a means to compare loss of function.

Along with dehydration, hyperthermia causes impairments of central nervous system (CNS) function. Jenson (3) states that normal thermoregulatory function is maintained with T_{re} (core temperature) as high as 39.5°C. Above this temperature, CNS function becomes progressively impaired. Under conditions of extreme physical exercise, T_{re} can reach as high as 41°C in healthy individuals. Between 41°C and 42°C convulsions occur and if T_{re} remains above 41°C for "extended intervals," permanent brain damage develops. As T_{re} reaches 43°C, heat stroke occurs and death frequently follows. Note that heat stroke was not predicted to occur during any of the simulations.

Simulated Alert 5 with ACM Scenario:

Condition	Ensemble	Time to 1% Dehyd	Time to 3% Dehyd	Time to 6% Dehyd	Time to 11% Dehyd	% Dehyd at EOS
COOL	WC	175				1.8%
	WE	130				2.2 %
	E	310				1.1 %
	A	240				1.4 %
	AA	157				1.7 %
WARM	WC	165	290			3.2 %
	WE	130	220			3.9 %
	E	185				2.9 %
	A	175	272			3.4 %
	AA	155	243			3.8 %
HOT	WC	160	210			5.1 %
	WE	130	190	239		8.9 %
	E	170	215	345		6.1 %
	A	167	205	267		8.1 %
	AA	155	195	247	340	11.2 %

Simulated Normal Operations with ACM Scenario:

Condition	Ensemble	Time to 1% Dehyd	Time to 3% Dehyd	Time to 6% Dehyd	% Dehyd at EOS
COOL	WC	175			2.4%
	WE	130			2.6 %
	E	245			1.9 %
	A	205			2.2 %
	AA	157			2.1 %
WARM	WC	165	290		3.3 %
	WE	130	235		3.8 %
	E	187	390		3.1 %
	A	172	320		3.3 %
	AA	155	290		3.5 %
HOT	WC	160	255		4.1 %
	WE	130	196		5.8 %
	E	170	280		4.5 %
	A	167	240		5.7 %
	AA	155	217	332	8.1 %

Table 5. Time (minutes) to dehydration (Dehyd) levels associated with function deficits based on accumulated sweat lost. EOS = end of simulation.

Simulated Normal Operations Scenario:

Condition	Ensemble	Time to 1% Dehyd	Time to 3% Dehyd	Time to 6% Dehyd	% Dehyd at EOS
COOL	WC	175			2.3%
	WE	130			2.6 %
	E	240			1.8 %
	A	202			2.1 %
	AA	157			2.0 %
WARM	WC	165	342		3.3 %
	WE	130	235		3.8 %
	E	187			2.9 %
	A	172	327		3.2 %
	AA	155	290		3.4 %
HOT	WC	160	255		4.0 %
	WE	130	196		5.7 %
	E	170	280		4.4 %
	A	167	240		5.5 %
	AA	155	217	337	7.9 %

Table 5 (continued). Time (minutes) to dehydration (Dehyd) levels associated with function deficits based on accumulated sweat lost. EOS = end of simulation.

Winter control (WC) and winter EAGLE (WE) ensembles

1. Simulated Alert 5 scenario

Table 6 contains the predicted peak values of T_{re}, T_{sk}, SR and HR and the time to reach those values. In Table 7 are the results of the statistical comparisons as well as the mean values ± one standard deviation. During cool conditions, mean estimated WE T_{re} was significantly greater than WC. The largest difference occurred during the 90 minute brief to launch period while the simulated pilot was waiting in the 70°F briefing room. Once the pilot left this area, T_{sk} fell rapidly to a level significantly cooler than the control ensemble. Figure 1 shows WC and WE T_{sk} and SR. The temperatures shown at the top of Figure 1 indicate the T_{db} for each phase (listed at the bottom) in the scenario. G-tolerance was somewhat reduced for both ensembles prior to take-off based on the predicted 1% dehydration levels. CNS function was not predicted to be impaired in either case (accumulated fluid loss 1.3 (WC) and 1.6 kg (WE)) and T_{re} did not rise above 39.5°C.

During warm conditions, there was no statistical difference between predicted ensemble parameters except that there was an overall greater amount of fluid loss with the WE configuration. Also, there was no predicted critical loss in CNS function, though the simulated pilot would lose some efficiency. However, it was predicted that the pilot wearing the WE would be 3% dehydrated with the associated drop in G-tolerance while waiting to take-off, whereas the pilot with the WC would experience the same predicted G-tolerance deficit after the ACMs were completed on his flight back to the base.

Condition	Ensemble	Tre	Time	Tsk	Time	SR	Time	HR	Time
COOL	WC	37.95	165	36.49	150	3.68	150	116.1	241
	WE	38.47	155	37.14	150	7.47	150	111.0	155
WARM	WC	38.65	210	37.3	190	8.79	200	119.6	237
	WE	38.91	180	37.56	165	11.79	170	119.3	241
HOT	WC	39.57	210	38.41	190	17.64	190	118.7	237
	WE	40.70	232	39.26	230	17.64	170	137.9	240

Table 6. Peak predicted values and the time (min) those peaks occurred during the simulated alert 5 scenario for winter ensembles. Temperatures in °C, SR in kg/hr and HR in beats/min. Note that 17.64 kg/hr is the theoretical maximum sweat rate.

Condition	Parameter	Mean WC	Mean WE	t	p	F	p
COOL	Tre	37.66 ± 0.02	37.79 ± 0.04	-3.01	0.003		
	Tsk	35.07 ± 0.09	33.56 ± 0.26	5.48	0.0001		
	SR	1.75 ± 0.10	1.75 ± 0.27	0.01	0.993		
	SWT	0.78 ± 0.05	1.17 ± 0.07	4.94	0.0001		
	HR	91.9 ± 1.32	88.5 ± 1.50			3.23	0.075
WARM	Tre	38.07 ± 0.05	38.10 ± 0.05			0.15	0.70
	Tsk	35.45 ± 0.15	35.58 ± 0.15			0.25	0.615
	SR	4.03 ± 0.29	4.36 ± 0.34	-0.72	0.474		
	SWT	1.38 ± 0.10	1.81 ± 0.13	-2.66	0.009		
	HR	96.9 ± 1.55	97.2 ± 1.59			0.01	0.908
HOT	Tre	38.46 ± 0.09	39.32 ± 0.15	-4.81	0.0001		
	Tsk	34.79 ± 0.32	36.90 ± 0.23	-5.40	0.0001		
	SR	6.23 ± 0.60	11.57 ± 0.82	-5.25	0.0001		
	SWT	2.19 ± 0.18	3.26 ± 0.27	-3.31	0.001		
	HR	96.8 ± 1.80	107.5 ± 2.13	-3.86	0.0002		

Table 7. Statistical test results during alert 5 simulation comparing winter control versus winter EAGLE ensembles. T_{re} and T_{sk} are given in °C ± 1 standard deviation. One-way ANOVA F statistics are given only for cases in which the variances were equal.

The predicted heat load was significantly greater with the WE during hot conditions as compared to WC. All mean parameters were statistically greater, with peak estimated WE T_{re} reaching 40.7°C while the pilot was flying to the area. The pilot was predicted to become 3% dehydrated while on alert 5 status while wearing either ensemble. However, CNS function was predicted to be compromised with the WE ensemble. Fluid losses were greater than 4.5 kg (> 6% dehydration) during the ACM portion of the mission. Estimated T_{re} was above 39.5°C for 80 minutes from the alert 5 open cockpit waiting period to the return flight periods. Based on the level of estimated dehydration (8.9% by the end of the simulation), the pilot wearing WE may have had some difficulty returning to base safely, according to Whittingham's descriptions.

2. Simulated normal operations with ACM scenario

Table 8 contains the predicted peak values of T_{re}, T_{sk}, SR and HR and the time to reach those values. Table 9 contains the results of the statistical comparisons and the mean values ± one standard deviation. Cool condition results indicated that while there was no statistical difference between ensemble SR and T_{re}, a significantly greater amount of fluid was lost and there was a larger amount of surface temperature cooling with the WE, particularly while the simulated aircraft was in flight. This cooling, as was the case with the cool Alert 5 scenario, was due to the higher SR occurring while the simulated pilot was waiting in the warm briefing room. With both ensembles, G-tolerance was somewhat reduced prior to take-off (1% dehydration), though THTM did not predict that CNS function would be seriously impaired.

Warm condition predictions indicated that there was no difference between mean WC and WE temperatures, though fluid loss was significantly greater with the WE. G-tolerance was predicted to be reduced for both ensembles while the simulated aircraft was on station, prior to performing high-G ACMs, with WE reaching the 3% dehydration level 55 minutes before WC. Overall, predicted CNS function impairment would have been about the same as during the warm Alert 5 scenario.

Under hot conditions, estimated mean WE T_{re}, T_{re}, SR and SWT were significantly higher than WC. Predicted WE dehydration reached 3% just before take-off while the equivalent level of reduced G-tolerance was estimated to occur while the aircraft was on station for WC. No critical loss of CNS function was predicted, though the simulated pilot would have been considerably more dehydrated after the mission when WE was worn.

Condition	Ensemble	Tre	Time	Tsk	Time	SR	Time	HR	Time
COOL	WC	37.95	175	36.49	150	3.68	150	119.9	300
	WE	38.47	155	37.12	140	7.47	150	112.3	300
WARM	WC	38.47	215	37.13	170	7.52	170	117.4	300
	WE	38.88	180	37.56	165	11.79	170	117.3	300
HOT	WC	38.86	190	38.02	170	13.53	170	117.4	300
	WE	39.32	180	38.5	170	17.64	170	121.0	300

Table 8. Peak predicted values and the time (min) those peaks occurred during the simulated normal operations with ACM scenario for winter ensembles. Temperatures in °C, SR in kg/hr and HR in beats/min. Note that 17.64 kg/hr is the theoretical maximum sweat rate.

Condition	Parameter	Mean WC	Mean WE	t	p	F	p
COOL	Tre	37.75 ± 0.02	37.84 ± 0.04	-1.80	0.075		
	Tsk	35.53 ± 0.07	34.17 ± 0.25	5.16	0.0001		
	SR	2.42 ± 0.01	2.34 ± 0.25	0.29	0.771		
	SWT	0.97 ± 0.06	1.35 ± 0.08	-3.84	0.0002		
	HR	94.5 ± 1.20	92.2 ± 1.29			1.67	0.20
WARM	Tre	37.93 ± 0.04	37.99 ± 0.06	-0.95	0.343		
	Tsk	35.53 ± 0.13	35.35 ± 0.14			0.84	0.361
	SR	3.49 ± 0.20	3.72 ± 0.34	-0.527	0.600		
	SWT	1.37 ± 0.10	1.78 ± 0.11			7.81	0.006
	HR	97.3 ± 1.37	96.3 ± 1.36			0.29	0.593
HOT	Tre	38.03 ± 0.06	38.24 ± 0.06			6.11	0.015
	Tsk	35.46 ± 0.18	35.98 ± 0.16	-2.17	0.032		
	SR	4.32 ± 0.40	5.75 ± 0.46	-2.33	0.021		
	SWT	1.64 ± 0.12	2.27 ± 0.16	-3.26	0.001		
	HR	97.6 ± 1.49	100.0 ± 1.43			1.39	0.24

Table 9. Statistical test results during normal operations with ACM simulation comparing winter control versus winter EAGLE ensembles. T_{re} and T_{sk} are given in $^{o}C \pm 1$ standard deviation. One-way ANOVA F statistics are listed only for cases in which the variances were equal.

3. Normal operations

Table 10 contains the predicted peak values of THTM parameters and Table 11 contains the means and results of the statistical comparisons between WE and WC. Comparing Tables 8 and 10, it can be seen that peak estimates of temperatures and SR were the same during normal operations scenarios with or without ACM. However, estimates of peak HR were marginally lower without ACM. Mean cool WE T_{sk} was statistically lower and T_{re} and SR were higher than WC in a similar fashion as in the two other scenarios. Fluid loss and CNS function changes were also essentially the same as the normal operations with ACM scenario.

During warm conditions, only mean WE SR was significantly greater than WC. Estimated dehydration and G-tolerance decrements were also very similar to the normal operations with ACM scenario, except that for WC the simulated pilot became 3% dehydrated during the return flight to base, 52 min later than normal operations with ACM.

Predicted dehydration and reduction in G-tolerance levels during hot conditions were also the same with or without ACM. Estimated mean WE T_{re}, SWT and SR were significantly higher than WC.

Condition	Ensemble	Tre	Time	Tsk	Time	SR	Time	HR	Time
COOL	WC	37.95	165	36.49	150	3.68	150	103.6	155
	WE	38.47	155	37.14	150	7.47	150	111.1	155
WARM	WC	38.47	215	37.13	170	7.52	170	113.5	170
	WE	38.88	180	37.56	165	11.79	170	115.6	170
HOT	WC	38.86	190	38.02	170	13.53	170	115.1	160
	WE	39.32	180	38.5	170	17.64	170	115.0	340

Table 10. Peak predicted values and the time (min) those peaks occurred during the simulated normal operations scenario for winter ensembles. Temperatures in °C, SR in kg/hr and HR in beats/min. Note that 17.64 kg/hr is the theoretical maximum sweat rate.

Condition	Parameter	Mean WC	Mean WE	t	p	F	p
COOL	Tre	37.73 ± 0.02	37.85 ± 0.05	-2.32	0.023		
	Tsk	35.50 ± 0.09	34.31 ± 0.29	3.91	0.0002		
	SR	2.25 ± 0.12	2.50 ± 0.29	-0.82	0.415		
	SWT	0.90 ± 0.07	1.28 ± 0.08	-3.51	0.001		
	HR	91.2 ± 0.79	89.8 ± 1.26	0.94	0.349		
WARM	Tre	37.93 ± 0.05	38.02 ± 0.06	-1.09	0.276		
	Tsk	35.67 ± 0.14	35.45 ± 0.16			1.01	0.318
	SR	3.56 ± 0.31	3.86 ± 0.39	-0.60	0.549		
	SWT	1.26 ± 0.10	1.67 ± 0.12			6.42	0.013
	HR	95.1 ± 1.33	93.9 ± 1.30			0.39	0.535
HOT	Tre	38.05 ± 0.06	38.26 ± 0.07			4.71	0.032
	Tsk	35.60 ± 0.20	36.05 ± 0.18			2.71	0.102
	SR	4.54 ± 0.45	5.93 ± 0.53	-1.99	0.049		
	SWT	1.52 ± 0.13	2.12 ± 0.17	-2.82	0.006		
	HR	95.4 ± 1.52	97.5 ± 1.41			1.09	0.298

Table 11. Statistical test results during normal operations simulation comparing winter control versus winter EAGLE ensembles. One-way ANOVA F statistics are given only for cases in which the variances were equal.

Summer EAGLE (E), ATAGS (A) and ATAGS with additional arm coverage (AA) ensembles

1. Simulated Alert 5 scenario

Table 12 contains the predicted peak values of T_{re}, T_{sk}, SR and HR and the time to reach those values. The results of the statistical comparisons and the mean values ± one standard deviation comparing E versus A are in Table 13, E versus AA are in Table 14 and A versus AA are in Table 15.

a. EAGLE vs ATAGS

During cool conditions, predicted mean A T_{sk}, SR and SWT were significantly higher than E values. Estimated A G-tolerance fell (1% dehydration) during ACM while the same level of fluid loss for E was not predicted to occur until the plane had landed and the pilot was being debriefed. At no time was thermoregulatory function compromised.

Also during cool conditions, predicted mean AA T_{re}, SR and SWT were significantly higher than E values. While predicted dehydration levels were the same, AA G-tolerance was reduced well before take-off, during the brief to launch period. Overall dehydration levels by the end of the simulation were essentially the same for all three ensembles.

There were no significant differences demonstrated between predicted E and A values during warm conditions. However, while it was predicted that E would only have 1% fluid loss (reached while on alert 5 status), A would become 3% dehydrated during the return flight (after the high-G maneuvers were completed). In either case, CNS function was not critically compromised.

During warm conditions, only AA predicted mean SWT was significantly larger than E. For AA, estimated 1% dehydration was reached during pre-flight inspection and 3% dehydration was reached during the ACM period. While it was estimated that AA would be about 1% more dehydrated by the end of the simulation as compared to E, AA CNS function was also not critically impaired.

Under hot conditions, estimated mean E T_{re}, T_{sk}, and SR were significantly lower than A values. SR reached its theoretical maximum for both ensembles. The simulated pilot became 3% dehydrated during the alert 5 waiting period for both ensembles. 6% dehydration levels were predicted for E during the debriefing period while the same level of fluid losses were reached earlier in the mission while wearing A (during the return flight to base). Also, CNS function was predicted to be critically compromised (fluid loss > 4.5 kg) while wearing A during the return flight. Predicted E T_{re} rose above 39.5°C for 30 min from the end of the alert 5 waiting period to the second ACM. Predicted A T_{re} > 39.5°C for 70 min during the alert 5 waiting period to the return flight period.

Estimated mean AA T_{re}, T_{sk}, SR, SWT and HR were all significantly greater than E values. Predicted reduction in dehydration levels for AA occurred during similar periods as with A. However, predicted AA T_{re} > 39.5°C for most of the operational part of the simulation, lasting 155 min from the alert 5 waiting period to the debriefing period. In fact, predicted T_{re} > 41°C for a total of 79 min. See Figure 2 for a comparison of E, A and AA T_{re}. Furthermore, AA CNS function was predicted to be critically compromised during the return flight. By the end of the simulation, dehydration levels reached the lowest of any scenario tested (11.2%). According to Whittingham, the simulated pilot would be at extreme risk towards the end of his mission.

Condition	Ensemble	Tre	Time	Tsk	Time	SR	Time	HR	Time
COOL	E	37.76	160	35.85	150	2.18	150	113.1	245
	A	37.84	160	36.28	150	2.83	150	116.0	245
	AA	38.05	160	36.73	150	4.52	150	113.3	244
WARM	E	38.55	245	37.11	229	9.08	245	126.1	240
	A	38.67	231	37.32	200	8.75	210	125.7	240
	AA	38.73	210	37.41	180	9.34	190	124.4	244
HOT	E	39.76	231	38.64	200	17.64	200	128.7	136
	A	40.34	236	39.35	200	17.64	190	136.4	244
	AA	41.60	245	40.76	229	17.64	180	137.2	244

Table 12. Peak predicted values and the time (min) those peaks occurred during the simulated alert 5 scenario for summer ensembles. Temperatures in °C, SR in kg/hr and HR in beats/min. Note that 17.64 kg/hr is the theoretical maximum sweat rate.

Condition	Parameter	Mean E	Mean A	t	p	F	p
COOL	Tre	37.57 ± 0.02	37.58 ± 0.02			0.38	0.536
	Tsk	34.35 ± 012	34.85 ± 0.11			9.21	0.003
	SR	0.979 ± 0.08	1.27 ± 0.09	-2.46	0.015		
	SWT	0.508 ± 0.03	0.60 ± 0.04	-2.03	0.045		
	HR	88.4 ± 1.23	90.5 ± 1.30			1.36	0.246
WARM	Tre	38.08 ± 0.05	38.17 ± 0.06			1.28	0.261
	Tsk	35.80 ± 0.15	35.84 ± 0.17			0.03	0.864
	SR	4.48 ± 0.35	4.93 ± 0.38			0.75	0.389
	SWT	1.13 ± 0.09	1.35 ± 0.11	-1.56	0.122		
	HR	99.4 ± 1.85	99.7 ± 1.86			0.02	0.893
HOT	Tre	38.66 ± 0.11	39.10 ± 0.15	-2.35	0.021		
	Tsk	35.94 ± 0.22	36.90 ± 0.21			9.74	0.002
	SR	8.27 ± 0.74	11.05 ± 0.88	-2.42	0.017		
	SWT	2.22 ± 0.20	2.64 ± 0.24	-1.32	0.189		
	HR	101.6 ± 2.07	106.0 ± 2.17			2.15	0.145

Table 13. Statistical test results during alert 5 simulation comparing summer EAGLE versus ATAGS ensembles. One-way ANOVA F statistics are given only for cases in which the variances were equal.

b. ATAGS vs ATAGS with additional arm coverage

The decrements in estimated G-tolerance and degree of dehydration were listed above in the discussion of summer EAGLE ensembles. In summary, additional arm coverage on the ATAGS ensemble produced the following statistically significant differences. During the cool environmental conditions, predicted mean AA T_{re} and SWT were greater than A. No differences were demonstrated during warm conditions. Both mean estimates of AA T_{re} and T_{sk} were greater than A during hot conditions.

Condition	Parameter	Mean E	Mean AA	t	p	F	p
COOL	Tre	37.57 ± 0.02	37.65 ± 0.03	-2.66	0.009		
	Tsk	34.35 ± 012	34.61 ± 0.15	-1.34	0.181		
	SR	0.979 ± 0.08	1.49 ± 0.14	-3.20	0.002		
	SWT	0.508 ± 0.03	0.80 ± 0.05	-5.34	0.0001		
	HR	88.4 ± 1.23	90.1 ± 1.34			0.81	0.369
WARM	Tre	38.08 ± 0.05	38.18 ± 0.06			1.82	0.180
	Tsk	35.80 ± 0.15	35.87 ± 0.17			0.09	0.766
	SR	4.48 ± 0.35	5.01 ± 0.36			1.13	0.291
	SWT	1.13 ± 0.09	1.59 ± 0.12	-3.05	0.003		
	HR	99.4 ± 1.85	100.0 ± 1.77			0.07	0.787
HOT	Tre	38.66 ± 0.11	39.96 ± 0.21	-5.36	0.0001		
	Tsk	35.94 ± 0.22	38.18 ± 0.23			48.88	0.0001
	SR	8.27 ± 0.74	12.80 ± 0.87	-3.98	0.0001		
	SWT	2.22 ± 0.20	3.20 ± .031	-2.69	0.008		
	HR	101.6 ± 2.07	110.1 ± 1.99			8.81	0.004

Table 14. Statistical test results during alert 5 simulation comparing summer EAGLE versus ATAGS with additional arm coverage ensembles. One-way ANOVA F statistics are given only for cases in which the variances were equal.

Condition	Parameter	Mean A	Mean AA	t	p	F	p
COOL	Tre	37.58 ± 0.02	37.65 ± 0.03	-2.04	0.043		
	Tsk	34.85 ± 0.11	34.61 ± 0.15	1.33	0.187		
	SR	1.27 ± 0.09	1.49 ± 0.14	-1.33	0.188		
	SWT	0.60 ± 0.04	0.80 ± 0.05	-3.43	0.001		
	HR	90.5 ± 1.30	90.1 ± 1.34			0.06	0.812
WARM	Tre	38.17 ± 0.06	38.18 ± 0.06			0.03	0.867
	Tsk	35.84 ± 0.17	35.87 ± 0.17			0.01	0.905
	SR	4.93 ± 0.38	5.01 ± 0.36			0.02	0.875
	SWT	1.35 ± 0.11	1.59 ± 0.12			2.22	0.139
	HR	99.7 ± 1.86	100.0 ± 1.77			0.02	0.895
HOT	Tre	39.10 ± 0.15	39.96 ± 0.21	-3.31	0.001		
	Tsk	36.90 ± 0.21	38.18 ± 0.23			16.72	0.0001
	SR	11.05 ± 0.88	12.80 ± 0.87			2.02	0.158
	SWT	2.64 ± 0.24	3.20 ± 0.31	-1.44	0.152		
	HR	106.0 ± 2.17	110.1 ± 1.99			1.97	0.163

Table 15. Statistical test results during alert 5 simulation comparing summer ATAGS versus ATAGS with additional arm coverage ensembles. One-way ANOVA F statistics are given only for cases in which the variances were equal.

2. Simulated normal operations with ACM scenario

Table 16 contains the predicted peak values of T_{re}, T_{sk}, SR and HR and the time to reach those values. The results of the statistical comparisons and the mean values

± one standard deviation comparing E versus A are in Table 17, E versus AA are in Table 18 and A versus AA are in Table 19.

a. EAGLE vs ATAGS

During cool conditions, predicted mean E T_{re}, T_{sk}, SWT and SR were significantly lower than A values. Both E and A were predicted to become 1% dehydrated earlier in this simulation than during the alert 5 scenario. E was predicted to reach this level while the aircraft was on station while A reached this point during the initial flight to the area. Dehydration levels were similar by the end of the simulation and CNS function was not predicted to be markedly impaired.

Also under cool conditions, estimated mean E T_{re} and SWT were significantly lower than AA values. AA mean T_{sk} was significantly cooler than E, probably due to the greater amount of sweating during the preflight periods. It was predicted than AA reached 1% dehydration during the pre-flight inspection period. Though this level of fluid loss was reached 48 min before it was predicted for A, overall fluid losses and CNS function decrements were the same as the other ensembles.

No statistically significant differences between predicted E and A values were demonstrated during warm conditions. The simulated pilot was 1% dehydrated while waiting to take-off. The 3% dehydration level was reached after the simulated ACM were completed, occurring during the debriefing period for E and during the return flight for A.

Predicted mean AA SWT was significantly greater than E during warm conditions. Unlike E or A, 3% dehydration for AA was predicted to occur while on station before the high-G maneuvers were to take place. However, by the end of the simulation, AA fluid loss was only an estimated 0.4% more than E.

Mean hot E T_{re} and SR were significantly lower than A. Both E and A were predicted become 3% dehydrated while on station and did not fall to 6% as occurred during the alert 5 simulation. Predicted T_{re} remained below 39.5°C and CNS function was not predicted to be critically compromised.

Predicted mean AA T_{re}, T_{sk}, SWT, SR and HR were significantly greater than E during hot conditions. It was predicted that the simulated pilot with AA would become 3% dehydrated while flying to the area and, unlike E or A, become 6% dehydrated while returning to the base. AA CNS function was predicted to be critically compromised during the post-flight secure/inspection period (fluid loss > 4.5 kg) and T_{re} > 39.5°C for about 10 min during the beginning of the debriefing period. Figure 3 shows the differences in predicted E, A and AA T_{re}.

b. ATAGS vs ATAGS with additional arm coverage

The decrements in estimated dehydration levels and G-tolerance were listed above in the discussion of summer EAGLE ensembles. In summary, additional arm coverage on the ATAGS ensemble produced the following statistically significant

differences. During the cool environmental conditions, predicted mean AA SWT was greater than A and AA mean T_{sk} was lower than A. No differences were demonstrated during warm conditions. Estimates of mean AA T_{re}, T_{sk}, SWT and SR were significantly higher than A during hot conditions. Also, predicted mean AA HR was marginally higher than A ($p<0.078$).

Condition	Ensemble	Tre	Time	Tsk	Time	SR	Time	HR	Time
COOL	E	37.76	160	35.85	150	2.18	150	120.3	300
	A	37.86	310	36.28	150	3.93	300	121.4	300
	AA	38.05	160	36.73	150	4.52	150	117.0	300
WARM	E	38.25	250	36.74	200	5.73	240	120.3	296
	A	38.44	225	37.16	200	7.05	215	118.9	300
	AA	38.53	190	37.27	170	8.61	170	118.3	300
HOT	E	38.69	215	37.82	350	10.88	170	120.4	299
	A	38.86	215	37.96	200	15.90	350	124.2	300
	AA	39.56	360	38.87	350	17.64	345	127.1	300

Table 16. Peak predicted values and the time (min) those peaks occurred during the simulated normal operations with ACM scenario for summer ensembles. Temperatures in °C, SR in kg/hr and HR in beats/min. Note that 17.64 kg/hr is the theoretical maximum sweat rate.

Condition	Parameter	Mean E	Mean A	t	p	F	p
COOL	Tre	37.65 ± 0.02	37.72 ± 0.02	-2.64	0.009		
	Tsk	35.30 ± 0.05	35.60 ± 0.07	-3.52	0.001		
	SR	1.80 ± 0.07	2.24 ± 0.09	-4.04	0.0001		
	SWT	0.68 ± 0.04	0.83 ± 0.06	-2.12	0.036		
	HR	92.3 ± 1.25	93.8 ± 1.25			0.77	0.381
WARM	Tre	37.89 ± 0.03	37.94 ± 0.04	-1.03	0.303		
	Tsk	35.59 ± 0.11	35.53 ± 0.15	0.297	0.767		
	SR	3.25 ± 0.19	3.56 ± 0.25	-0.990	0.324		
	SWT	1.15 ± 0.09	1.33 ± 0.10			1.75	0.188
	HR	97.2 ± 1.42	97.5 ± 1.46			0.03	0.871
HOT	Tre	38.07 ± 0.05	38.24 ± 0.06	-2.18	0.031		
	Tsk	35.91 ± 0.16	36.26 ± 0.15			2.49	0.117
	SR	4.87 ± 0.37	6.05 ± 0.44	-2.06	0.041		
	SWT	1.55 ± 0.12	1.87 ± 0.16	-1.58	0.116		
	HR	99.5 ± 1.59	101.8 ± 1.59			1.01	0.316

Table 17. Statistical test results during normal operations with ACM simulation comparing summer EAGLE versus ATAGS ensembles. One-way ANOVA F statistics are given only for cases in which the variances were equal.

Condition	Parameter	Mean E	Mean AA	t	p	F	p
COOL	Tre	37.65 ± 0.02	37.72 ± 0.03	-2.32	0.022		
	Tsk	35.30 ± 0.05	34.90 ± 0.18	2.10	0.039		
	SR	1.80 ± 0.07	1.98 ± 0.15	-1.14	0.258		
	SWT	0.68 ± 0.04	0.99 ± 0.06	-4.25	0.0001		
	HR	92.3 ± 1.25	92.3 ± 1.26			0.00	0.999
WARM	Tre	37.89 ± 0.03	37.97 ± 0.05	-1.40	0.163		
	Tsk	35.59 ± 0.11	35.46 ± 0.17	0.63	0.533		
	SR	3.25 ± 0.19	3.68 ± 0.29	-1.24	0.217		
	SWT	1.15 ± 0.09	1.51 ± 0.10	-2.63	0.010		
	HR	97.2 ± 1.42	100.4 ± 1.42			0.03	0.865
HOT	Tre	38.07 ± 0.05	38.54 ± 0.07	-5.46	0.0001		
	Tsk	35.91 ± 0.16	36.81 ± 0.13	-4.43	0.0001		
	SR	4.87 ± 0.37	8.26 ± 0.50	-5.42	0.0001		
	SWT	1.55 ± 0.12	2.48 ± 0.22	-3.74	0.0003		
	HR	99.5 ± 1.59	105.7 ± 1.56			7.82	0.006

Table 18. Statistical test results during normal operations with ACM simulation comparing summer EAGLE versus ATAGS with additional arm coverage ensembles. One-way ANOVA F statistics are given only for cases in which the variances were equal.

Condition	Parameter	Mean A	Mean AA	t	p	F	p
COOL	Tre	37.72 ± 0.02	37.72 ± 0.03	-0.12	0.903		
	Tsk	35.60 ± 0.07	34.90 ± 0.18	3.56	0.001		
	SR	2.24 ± 0.09	1.98 ± 0.15	1.53	0.130		
	SWT	0.83 ± 0.06	0.99 ± 0.06			3.94	0.049
	HR	93.8 ± 1.25	92.3 ± 1.26			0.76	0.384
WARM	Tre	37.94 ± 0.04	37.97 ± 0.05			0.18	0.675
	Tsk	35.53 ± 0.15	35.46 ± 0.17			0.10	0.757
	SR	3.56 ± 0.25	3.68 ± 0.29			0.09	0.762
	SWT	1.33 ± 0.10	1.51 ± 0.10			1.59	0.21
	HR	97.5 ± 1.46	100.4 ± 1.42			0.00	0.996
HOT	Tre	38.24 ± 0.06	38.54 ± 0.07	-3.35	0.001		
	Tsk	36.26 ± 0.15	36.81 ± 0.13	-2.78	0.006		
	SR	6.05 ± 0.44	8.26 ± 0.50	-3.31	0.001		
	SWT	1.87 ± 0.16	2.48 ± 0.22	-2.31	0.022		
	HR	101.8 ± 1.59	105.7 ± 1.56			3.16	0.078

Table 19. Statistical test results during normal operations with ACM simulation comparing summer ATAGS versus ATAGS with additional arm coverage ensembles. One-way ANOVA F statistics are given only for cases in which the variances were equal.

3. Simulated normal operations scenario

Table 20 contains the predicted peak values of T_{re}, T_{sk}, SR and HR and the time to reach those values. Statistical test results and the mean values ± one standard

deviation comparing E versus A are in Table 21, E versus AA are in Table 22 and A versus AA are in Table 23.

a. EAGLE vs ATAGS

Mean predicted E T_{re}, T_{sk} and SR were significantly lower than A values during cool conditions. E was predicted to become 1% dehydrated while on station and A reached that level during the initial flight period. The time to reach these levels, as well as the estimated fluid loss by the end of the simulations were essentially the same whether ACMs were included during normal operations or not.

Mean estimates of T_{re}, SR and SWT for AA were significantly higher than E values during cool conditions. It was predicted that AA would become 1% dehydrated during the brief to launch period, prior to take-off. There were marginal differences in estimated fluid loss levels between the three ensembles by the end of the simulations.

No statistically significant differences between E and A were found under warm conditions. Both E and A were predicted to be 1% dehydrated prior to take-off, though only A was predicted to have 3% fluid losses (during the return flight).

During warm conditions, predicted mean AA SWT was greater than E. It was predicted that AA reach the 3% dehydration level while on station and that the pilot wearing AA would be would have 0.5% greater fluid loss by the of the simulation as compared to E.

In contrast to the normal operations with ACM scenario, no differences were demonstrated between mean estimated A and E values during hot conditions. Under these conditions, however, both ensembles were predicted to become 3% dehydrated while on station. T_{re}, did not rise above 39.5°C under any of the E or A normal operations scenarios.

The extra heat load associated with additional arm coverage under hot conditions was sufficient to cause estimated mean AA T_{re}, T_{sk} SR, SWT and HR to be significantly greater than E values. Under these conditions, AA was estimated to be 3% dehydrated while flying to the area and 6% dehydrated while returning to the base. Estimated CNS function was also predicted to be critically compromised while performing the post-flight inspections (SWT > 4.5 kg), though T_{re} < 39.5°C for AA.

b. ATAGS vs ATAGS with additional arm coverage

The decrements in estimated dehydration levels and G-tolerance were listed above in the discussion of the summer EAGLE ensemble. In summary, additional arm coverage on the ATAGS ensemble produced the following statistically significant differences. During the cool environmental conditions, predicted mean AA T_{sk} was lower than A. No differences were demonstrated during warm conditions. Estimates of mean AA T_{re}, T_{sk} and SR were significantly higher than A during hot conditions. Also,

predicted mean AA SWT and HR were marginally higher than A ($p = 0.053$ and $p = 0.068$, respectively).

Condition	Ensemble	Tre	Time	Tsk	Time	SR	Time	HR	Time
COOL	E	37.76	160	35.85	150	2.18	150	97.15	155
	A	37.84	160	36.28	150	2.83	150	99.9	155
	AA	38.05	160	36.73	150	4.52	150	104.8	155
WARM	E	38.25	250	36.74	200	5.73	240	110.3	170
	A	38.44	225	37.16	200	7.05	215	112.5	170
	AA	38.53	190	37.27	170	8.61	170	114.7	170
HOT	E	38.69	215	37.71	170	12.46	350	115.1	165
	A	38.86	215	38.02	345	15.57	350	114.8	160
	AA	39.45	360	38.81	350	17.64	345	114.5	160

Table 20. Peak predicted values and the time (min) those peaks occurred during the simulated normal operations scenario for summer ensembles. Temperatures in °C, SR in kg/hr and HR in beats/min. Note that 17.64 kg/hr is the theoretical maximum sweat rate.

Condition	Parameter	Mean E	Mean A	t	p	F	p
COOL	Tre	37.63 ± 0.02	37.69 ± 0.02			4.45	0.037
	Tsk	35.26 ± 0.06	35.53 ± 0.08	-2.91	0.004		
	SR	1.59 ± 0.05	1.98 ± 0.08	-4.17	0.0001		
	SWT	0.63 ± 0.05	0.77 ± 0.06	-1.76	0.081		
	HR	88.7 ± 0.67	90.3 ± 0.70			2.60	0.110
WARM	Tre	37.85 ± 0.04	37.92 ± 0.05	-1.22	0.223		
	Tsk	35.62 ± 0.12	35.58 ± 0.18	0.186	0.853		
	SR	3.02 ± 0.21	3.47 ± 0.30	-1.24	0.219		
	SWT	1.04 ± 0.10	1.21 ± 0.11			1.30	0.256
	HR	94.3 ± 1.24	95.0 ± 1.42			0.14	0.708
HOT	Tre	38.06 ± 0.06	38.21 ± 0.07			2.97	0.088
	Tsk	35.94 ± 0.18	36.24 ± 0.18			1.52	0.220
	SR	4.85 ± 0.43	5.94 ± 0.50	-1.65	0.101		
	SWT	1.42 ± 0.14	1.71 ± 0.17	-1.32	0.188		
	HR	96.9 ± 1.57	98.8 ± 1.56			0.71	0.402

Table 21. Statistical test results during normal operations simulation comparing summer EAGLE versus ATAGS ensembles. One-way ANOVA F statistics are given only for cases in which the variances were equal.

Condition	Parameter	Mean E	Mean AA	t	p	F	p
COOL	Tre	37.63 ± 0.02	37.72 ± 0.03	-2.64	0.010		
	Tsk	35.26 ± 0.06	35.02 ± 0.18	1.22	0.225		
	SR	1.59 ± 0.05	1.99 ± 0.17	-2.27	0.027		
	SWT	0.63 ± 0.05	0.93 ± 0.06	-3.73	0.0003		
	HR	88.7 ± 0.67	89.5 ± 0.93	-0.69	0.491		
WARM	Tre	37.85 ± 0.04	37.96 ± 0.05	-1.87	0.064		
	Tsk	35.62 ± 0.12	35.50 ± 0.20	0.51	0.613		
	SR	3.02 ± 0.21	3.70 ± 0.34	-1.70	0.093		
	SWT	1.04 ± 0.10	1.39 ± 0.11	-2.37	0.020		
	HR	94.3 ± 1.24	95.1 ± 1.40			0.19	0.665
HOT	Tre	38.06 ± 0.06	38.47 ± 0.08	-4.31	0.0001		
	Tsk	35.94 ± 0.18	36.76 ± 0.15	-3.56	0.001		
	SR	4.85 ± 0.43	7.81 ± 0.57	-4.17	0.0001		
	SWT	1.42 ± 0.14	2.27 ± 0.23	-3.15	0.002		
	HR	96.9 ± 1.57	102.8 ± 1.51			7.26	0.008

Table 22. Statistical test results during normal operations simulation comparing summer EAGLE versus ATAGS with additional arm coverage ensembles. One-way ANOVA F statistics are given only for cases in which the variances were equal.

Condition	Parameter	Mean A	Mean AA	t	p	F	p
COOL	Tre	37.69 ± 0.02	37.72 ± 0.03	-0.95	0.347		
	Tsk	35.53 ± 0.08	35.02 ± 0.18	2.57	0.012		
	SR	1.98 ± 0.08	1.99 ± 0.17	-0.05	0.916		
	SWT	0.77 ± 0.06	0.93 ± 0.06			3.44	0.066
	HR	90.3 ± 0.70	89.5 ± 0.93	-0.66	0.512		
WARM	Tre	37.92 ± 0.05	37.96 ± 0.05			0.47	0.495
	Tsk	35.58 ± 0.18	35.50 ± 0.20			0.09	0.768
	SR	3.47 ± 0.30	3.70 ± 0.34			0.26	0.614
	SWT	1.21 ± 0.11	1.39 ± 0.11			1.41	0.238
	HR	95.0 ± 1.42	95.1 ± 1.40			0.00	0.959
HOT	Tre	38.21 ± 0.07	38.47 ± 0.08	-2.61	0.010		
	Tsk	36.24 ± 0.18	36.76 ± 0.15			5.08	0.026
	SR	5.94 ± 0.50	7.81 ± 0.57			6.12	0.015
	SWT	1.71 ± 0.17	2.27 ± 0.23	-1.96	0.053		
	HR	98.8 ± 1.56	102.8 ± 1.51			3.39	0.068

Table 23. Statistical test results during normal operations simulation comparing summer ATAGS versus ATAGS with additional arm coverage ensembles. One-way ANOVA F statistics are given only for cases in which the variances were equal.

DISCUSSION

From these results, it was clear that the highest predicted thermal load occurred during the alert 5 with ACM scenario during the warm and hot conditions because of the extended period spent waiting in the cockpit without any external cooling available. This

is particularly evident when one compares the plots of predicted T_{re} for the summer ensembles between the two ACM scenarios (see Figures 2 and 3). Without the wait on the flight line, predicted T_{re} is at least 1.2°C cooler by the time the simulated pilot takes off (Alert 5 T_{re}: E = 39.8°C, A = 40.3°C, AA = 41.4°C; Normal operations with ACM T_{re}: E = 38.6°C, A = 38.8°C, AA = 38.9°C).

On the other hand, it took a somewhat longer period of time to become dehydrated during the alert 5 with ACM scenario as compared to the normal operations with ACM while it was cool. This could be due to the shorter length of the alert 5 scenario as compared to the others or to the rather significant peripheral cooling effect that occurred when the simulated pilot went from the warm briefing room out into the 40°F airfield to wait until take-off. The latter reason is supported by the fact that after the normal operations with ACM pre-flight inspection period, predicted SR began to rise while it remained low until the aircraft launched during the alert 5 scenario. However, there is some evidence to support the former reason when warm ACM scenarios are considered. E was predicted to become 3% dehydrated after 390 minutes during the normal operations with ACM scenario, well after the alert 5 mission was completed. Given the fact that there was only a 0.2% difference in predicted fluid loss by the end of each ACM simulation, the relatively slower time to reach certain dehydration levels should not be taken as evidence that the alert 5 scenario was less taxing during warm conditions. Nevertheless, except for WC, predicted T_{re} rose above 39.5°C during the hot alert 5 with ACM scenario from the time the simulated pilot was waiting to take-off to performing high-G maneuvers. While predicted T_{re} for the summer EAGLE remained below 40°C during these maneuvers, it reached 40.3°C for ATAGS during ACM and 41.6°C for AA during ACM. Only during the normal operations with ACM did T_{re} briefly go above that level for any of the ensembles (i.e. AA).

Based on Whittingham's criteria, CNS function was predicted to be critically compromised during the hot alert 5 with ACM scenario while the simulated pilot was still in the air for the winter EAGLE, ATAGS and ATAGS with additional arm coverage. As such, according to THTM predictions, wearing these ensembles under these conditions would not be recommended. Also, G-tolerance was predicted to be compromised prior to engagement for all five suit configurations modelled. It appears that when comparing the THTM predictions between the various scenarios with ACMs, it was clear that the relatively poorer level of CNS function associated with the ensembles during Alert 5 conditions was due to the higher thermal load caused by waiting on the flight line without the benefit of external cooling. Therefore, if portable cooling units could be used on the flight line, such degradation in function might be avoided. Also, THTM did not have provisions to allow for fluid intake during flight operations, either while waiting to launch or during flight, even though actual aviators can bring fluid with them into the cockpit. Such intake would no doubt have lowered the overall dehydration levels predicted. With that in mind, the reader is encouraged to view these results as "worst case scenarios."

During the cool alert 5 simulation, predicted T_{sk} fell more rapidly and to a greater extent than it did in the other scenarios, particularly when WC and WE were compared (see Figure 1). This could be attributed to a significantly greater SR and SWT associated

with WE ensemble from briefing to immediately prior to launch (for the first 220 min of the simulation comparing WC to WE SR: $p = 0.007$, SWT $p = 0.045$), as well as the requirement that the simulated pilot remained in the cooler environment rather than return to the briefing room. The greater amount of moisture in the garments probably led to higher cooling rates once the pilot left the briefing room.

As expected, the highest thermal load and greatest incidence of predicted T_{re} > 39.5°C and fluid loss > 4.5 kg was with the AA ensemble. This was because AA had the largest amount of body surface covered with impermeable bladders. It was unclear from these results alone that any additional increase in G-tolerance afforded by additional external pressurization would offset the reduction in tolerance caused by the relatively higher amount and faster rise of dehydration predicted for AA.

During cool and warm conditions, there were few operationally significant predicted differences between WC and WE. G-tolerance was estimated to be reduced due to fluid losses for both ensembles and predicted T_{re} did not rise above 39.5°C. The reason WC and WE were modelled in a hot environment was to simulate the case in which an aircraft would be launched from a cool environment, e.g. Northern Europe, and land in a hot environment, e.g. the Middle East. Without fluid supplements available, THTM predictions indicate that flying such a route while wearing WE would be hazardous.

When one compares the predictions between the two normal operations scenarios, it is apparent that the addition of 10 min of ACMs during the normal operations scenario did not significantly alter any of the predicted parameters in terms of increased thermal load or reduced G-tolerance and/or CNS function.

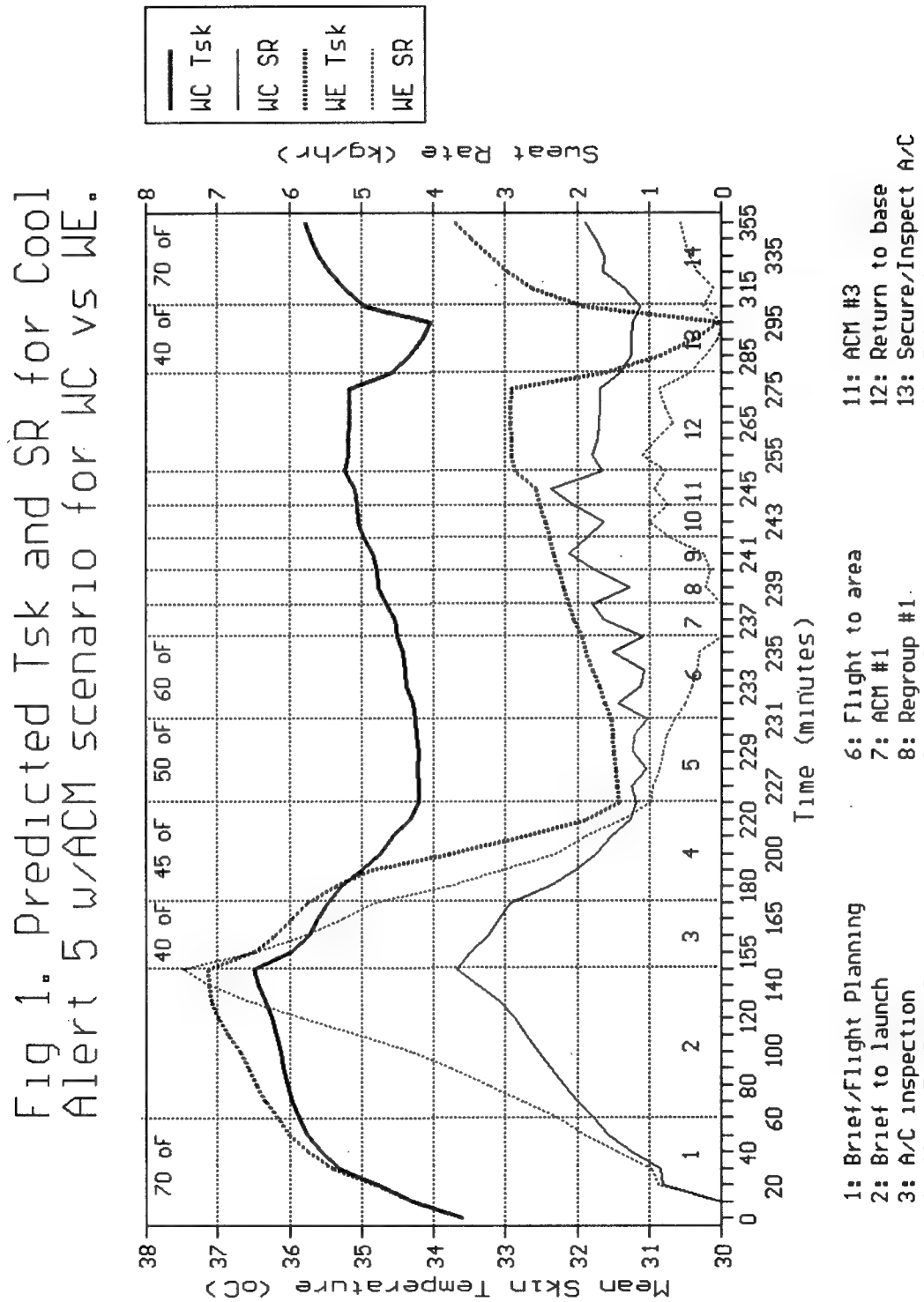


Fig 1. Predicted Tsk and SR for Cool Alert 5 w/ACM scenario for WC vs WE.
WC Tsk
WC SR
WE Tsk
WE SR
Mean Skin Temperature (oC)
Sweat Rate (kg/hr)
Time (minutes)
70 oF
40 oF
45 oF
50 oF
60 oF
1: Brief/Flight Planning
2: Brief to launch
3: A/C inspection
4: Alert 5: Open Canopy
5: Alert 5: Closed Canopy
6: Flight to area
7: ACM #1
8: Regroup #1
9: ACM #2
10: Regroup #2
11: ACM #3
12: Return to base
13: Secure/Inspect A/C
14: Debrief

Fig 2. Predicted Tre for Hot Alert 5
w/ACM scenario for E, A and AA.

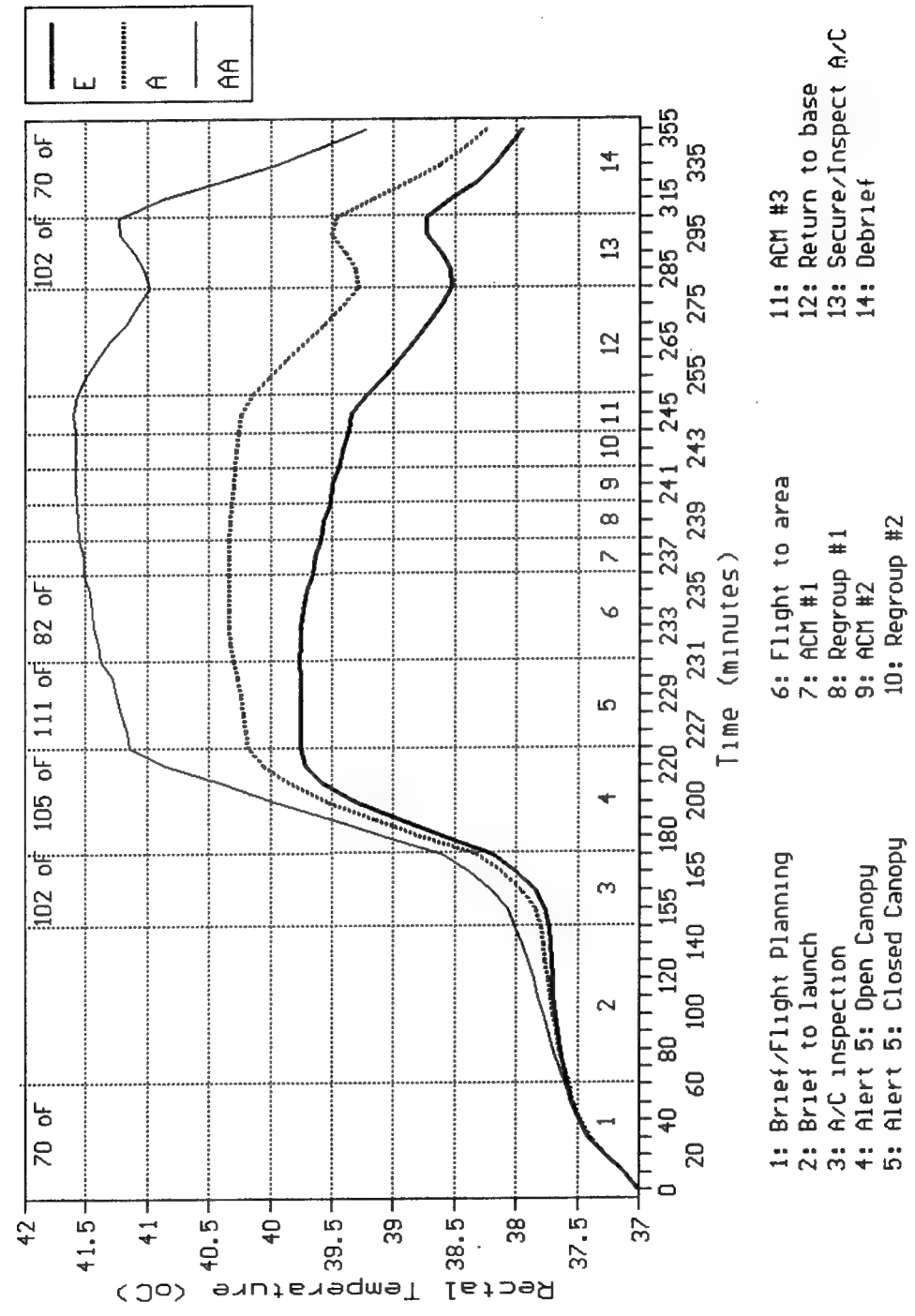
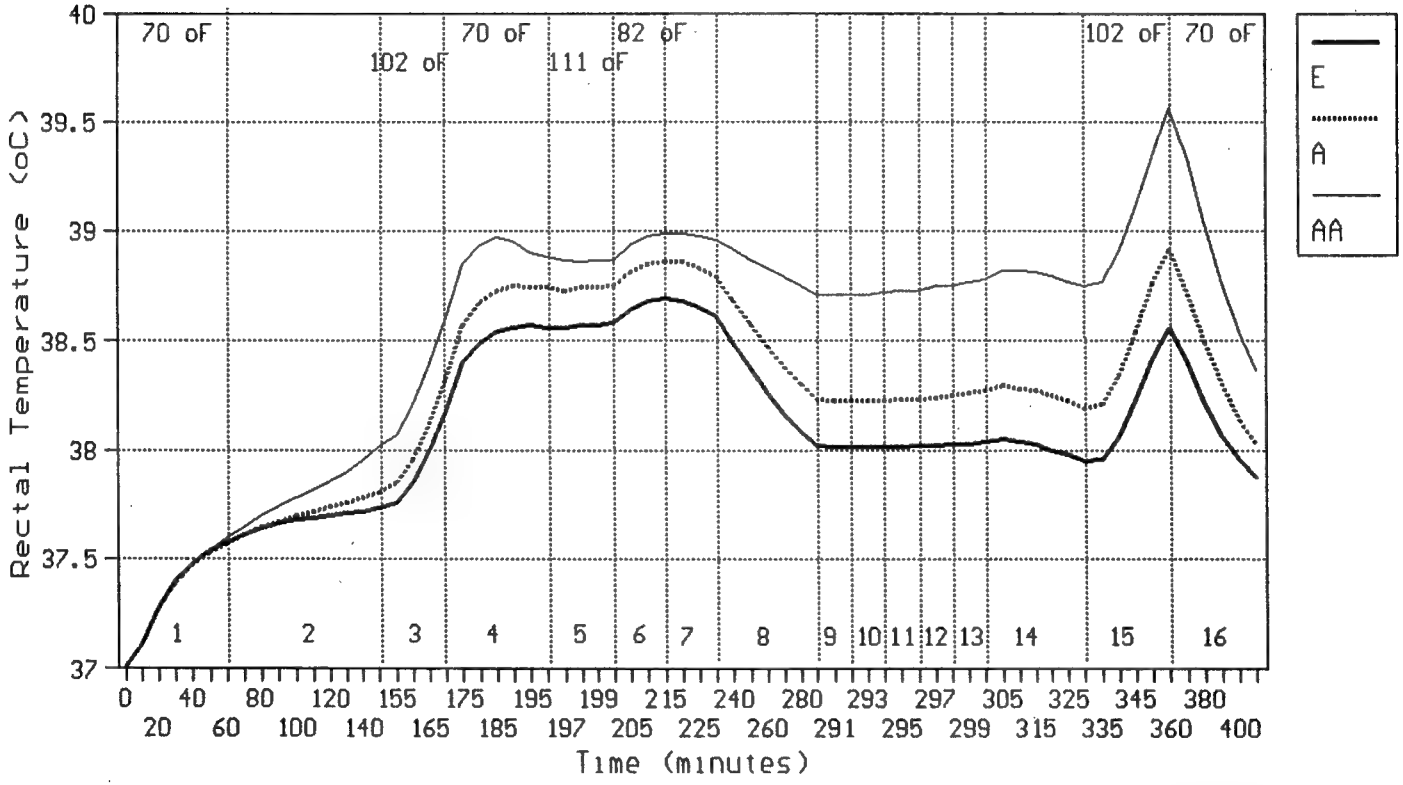


Fig 3. Predicted Tre for Hot Normal Operations w/ACM for E, A and AA.



1: Brief/Flight Planning
2: Brief to launch
3: A/C inspection
4: Wait to launch
5: Close Canopy
6: Initial flight
7: Filght to area
8: On station
9: ACM #1
10: Regroup #1
11: ACM #2
12: Regroup #2
13: ACM #3
14: Return to base
15: Secure/Inspect A/C
16: Debrief

APPENDIX A:

THTM Predictions of Rectal (T_{re}) and Mean Skin Temperatures in ^{o}C (T_{sk}), Heart Rate (HR, beats/min), Sweat Rate (SR, kg/hr) and Accumulated Sweat (SWT, kg)

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The views expressed herein are solely those of the author and should not be construed as the official policy or position of the US Department of Defense or the US Department of the Navy.

Winter Control Ensemble
Cool Environment
ALERT 5 w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	68.2	Return to base	250	37.65	35.23	1.65	0.97	90.0
	10	37.11	34.27	0.00	0.00	77.9		255	37.66	35.19	1.79	0.98	90.2
	20	37.28	34.77	0.81	0.01	80.3		260	37.66	35.18	1.71	1.00	90.3
	30	37.41	35.29	0.84	0.03	84.1		265	37.66	35.17	1.69	1.02	90.6
	40	37.49	35.57	1.25	0.05	85.2		270	37.66	35.17	1.68	1.03	90.7
	50	37.55	35.75	1.56	0.08	87.2		275	37.65	35.17	1.67	1.05	90.9
Brief to launch	60	37.60	35.86	1.77	0.11	88.6	Secure/Inspect	280	37.66	34.57	1.39	1.06	93.7
	70	37.64	35.95	1.99	0.15	89.8	Aircraft	285	37.67	34.32	1.24	1.08	93.9
	80	37.68	36.03	2.18	0.19	90.6		290	37.68	34.16	1.25	1.09	93.7
	90	37.71	36.08	2.36	0.24	91.4		295	37.69	34.03	1.22	1.10	93.3
	100	37.74	36.13	2.53	0.28	92.0	Debrief	305	37.66	34.94	1.11	1.12	83.6
	110	37.77	36.18	2.70	0.34	92.6		315	37.64	35.23	1.34	1.15	82.1
	120	37.80	36.23	2.87	0.39	93.3		325	37.63	35.43	1.64	1.17	85.2
	130	37.82	36.32	3.07	0.45	94.2		335	37.63	35.58	1.62	1.21	85.9
	140	37.85	36.42	3.38	0.51	95.9		345	37.64	35.69	1.75	1.24	86.9
Aircraft	150	37.89	36.49	3.68	0.58	97.5		355	37.66	35.77	1.88	1.27	87.8
Inspection	155	37.93	35.97	3.49	0.62	103.6							
	160	37.94	35.73	3.25	0.65	101.4							
	165	37.95	35.59	3.07	0.68	100.1							
Alert Status:	170	37.95	35.47	2.93	0.70	99.1							
Open Canopy	180	37.89	35.28	2.39	0.76	85.9							
	190	37.83	35.00	2.03	0.80	84.5							
	200	37.77	34.74	1.74	0.83	83.4							
	210	37.72	34.55	1.53	0.86	82.7							
	220	37.67	34.33	1.27	0.89	82.0							
Close Canopy	226	37.65	34.20	1.19	0.90	81.5							
	227	37.64	34.20	1.24	0.90	82.1							
	228	37.64	34.22	1.03	0.90	81.6							
	229	37.64	34.20	1.23	0.91	81.4							
	230	37.63	34.23	1.20	0.91	82.3							
Flight to area	231	37.62	34.25	1.01	0.91	86.4							
	232	37.62	34.27	1.43	0.91	87.9							
	233	37.62	34.36	1.11	0.91	88.8							
	234	37.62	34.39	1.07	0.92	87.7							
	235	37.61	34.42	1.50	0.92	88.7							
ACM #1	236	37.61	34.50	1.09	0.92	114.3							
	237	37.61	34.53	1.64	0.92	114.8							
Regroup #1	238	37.61	34.64	1.78	0.93	99.9							
	239	37.61	34.75	1.28	0.93	99.4							
ACM #2	240	37.62	34.77	1.75	0.93	115.7							
	241	37.62	34.84	2.13	0.94	116.1							
Regroup #2	242	37.63	34.97	1.86	0.94	101.4							
	243	37.63	35.04	1.63	0.94	100.5							
ACM #3	244	37.64	35.05	2.04	0.95	116.5							
	245	37.64	35.10	2.37	0.95	117.2							

1% Dehydration after 180 minutes

% Dehydrated by the end of the simulation: 1.8%

Winter Control Ensemble
Warm Environment
ALERT 5 w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	68.2	Return to base	250	38.31	35.05	4.20	1.96	91.9
	10	37.11	34.27	0.00	0.00	77.9		255	38.26	34.62	3.79	2.00	90.6
	20	37.28	34.77	0.81	0.01	80.3		260	38.21	34.24	3.41	2.03	89.6
	30	37.41	35.29	0.84	0.03	84.1		265	38.15	33.94	3.10	2.06	88.9
	40	37.49	35.57	1.25	0.05	85.2		270	38.09	33.71	2.86	2.09	88.7
	50	37.55	35.75	1.56	0.08	87.2		275	38.04	33.55	2.75	2.11	88.8
Brief to launch	60	37.60	35.86	1.77	0.11	88.6	Secure/Inspect	280	37.99	33.79	2.69	2.14	94.8
	70	37.64	35.95	1.99	0.15	89.8	Aircraft	285	37.96	33.95	2.96	2.16	95.1
	80	37.68	36.03	2.18	0.19	90.6		290	37.94	34.07	3.09	2.18	94.8
	90	37.71	36.08	2.36	0.24	91.4		295	37.92	34.17	3.00	2.20	94.3
	100	37.74	36.13	2.53	0.28	92.0	Debrief	305	37.86	33.94	0.97	2.24	81.7
	110	37.77	36.18	2.70	0.34	92.6		315	37.80	33.55	1.68	2.27	80.4
	120	37.80	36.23	2.87	0.39	93.3		325	37.74	33.48	1.41	2.29	82.3
	130	37.82	36.32	3.07	0.45	94.2		335	37.69	33.45	0.42	2.31	80.8
	140	37.85	36.42	3.38	0.51	95.9		345	37.64	33.40	0.98	2.33	80.0
Aircraft	150	37.89	36.49	3.68	0.58	97.5		355	37.61	33.54	0.85	2.34	81.7
Inspection	155	37.94	36.72	4.89	0.62	110.1							
	160	38.00	36.90	5.81	0.67	111.6							
	165	38.09	37.03	6.68	0.74	112.6							
Alert Status:	170	38.19	37.13	7.52	0.81	113.5							
Open Canopy	180	38.38	37.25	8.08	0.97	108.2							
	190	38.50	37.30	8.60	1.14	108.6							
	200	38.60	37.30	8.79	1.32	108.4							
	210	38.65	37.10	8.31	1.50	107.3							
	220	38.63	36.56	6.67	1.65	101.5							
Close Canopy	226	38.55	36.25	5.95	1.72	96.4							
	227	38.54	36.26	5.89	1.73	96.3							
	228	38.53	36.27	5.84	1.74	96.0							
	229	38.52	36.27	5.80	1.76	95.9							
	230	38.51	36.27	5.75	1.77	95.8							
Flight to area	231	38.48	36.20	5.60	1.78	98.8							
	232	38.47	36.05	5.64	1.79	99.3							
	233	38.46	35.92	5.42	1.80	98.9							
	234	38.45	35.80	5.23	1.81	97.8							
	235	38.44	35.68	5.12	1.82	97.0							
ACM #1	236	38.42	35.56	5.47	1.83	117.5							
	237	38.41	35.52	6.04	1.84	119.6							
Regroup #1	238	38.40	35.55	5.52	1.85	107.4							
	239	38.39	35.53	5.11	1.86	105.5							
ACM #2	240	38.38	35.46	5.60	1.87	119.3							
	241	38.37	35.45	5.89	1.88	120.4							
Regroup #2	242	38.36	35.49	5.39	1.89	107.3							
	243	38.36	35.47	5.01	1.90	105.4							
ACM #3	244	38.35	35.40	5.48	1.91	119.1							
	245	38.35	35.40	5.77	1.92	120.3							

1% Dehydration after 165 minutes
3% Dehydration after 290 minutes
% Dehydrated by the end of the simulation: 3.2%

Winter Control Ensemble
Hot Environment
ALERT 5 w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	68.2	Return to base	250	38.75	32.01	5.94	3.23	85.7
	10	37.11	34.27	0.00	0.00	77.9		255	38.65	31.55	4.27	3.27	83.8
	20	37.28	34.77	0.81	0.01	80.3		260	38.56	31.12	4.63	3.30	83.0
	30	37.41	35.29	0.84	0.03	84.1		265	38.48	30.82	4.07	3.33	81.7
	40	37.49	35.57	1.25	0.05	85.2		270	38.40	30.65	3.45	3.36	81.6
	50	37.55	35.75	1.56	0.08	87.2		275	38.32	30.50	3.29	3.38	80.8
Brief to launch	60	37.60	35.86	1.77	0.11	88.6	Secure/Inspect	280	38.24	33.85	3.90	3.41	87.1
	70	37.64	35.95	1.99	0.15	89.8	Aircraft	285	38.20	35.09	4.38	3.45	89.7
	80	37.68	36.03	2.18	0.19	90.6		290	38.17	35.68	4.71	3.49	92.9
	90	37.71	36.08	2.36	0.24	91.4		295	38.15	36.03	4.99	3.54	96.5
	100	37.74	36.13	2.53	0.28	92.0	Debrief	305	38.10	32.72	2.23	3.60	80.2
	110	37.77	36.18	2.70	0.34	92.6		315	38.03	31.32	1.88	3.64	76.4
	120	37.80	36.23	2.87	0.39	93.3		325	37.95	30.52	1.37	3.66	75.2
	130	37.82	36.32	3.07	0.45	94.2		335	37.86	30.03	0.27	3.68	74.4
	140	37.85	36.42	3.38	0.51	95.9		345	37.73	29.74	0.00	3.68	74.5
Aircraft	150	37.89	36.49	3.68	0.58	97.5		355	37.56	29.58	0.00	3.68	74.8
Inspection	155	37.95	37.24	6.42	0.64	112.3							
	160	38.07	37.56	8.90	0.72	115.1							
	165	38.24	37.79	11.30	0.82	114.2							
Alert Status:	170	38.44	38.02	13.53	0.95	113.7							
Open Canopy	180	38.89	38.39	16.64	1.30	109.5							
	190	39.24	38.41	17.64	1.68	110.3							
	200	39.48	38.12	16.99	2.06	111.5							
	210	39.57	37.88	15.15	2.40	112.6							
	220	39.53	37.63	13.32	2.70	111.3							
Close Canopy	226	39.45	37.40	12.39	2.86	109.6							
	227	39.44	37.31	12.10	2.89	109.4							
	228	39.43	37.25	11.77	2.91	108.9							
	229	39.41	37.20	11.51	2.94	108.4							
	230	39.40	37.16	11.28	2.96	108.0							
Flight to area	231	39.36	36.76	10.58	2.98	110.1							
	232	39.34	36.11	9.73	3.00	107.1							
	233	39.32	35.56	8.83	3.02	102.0							
	234	39.29	35.07	8.51	3.04	98.1							
	235	39.26	34.66	8.19	3.05	96.2							
ACM #1	236	39.20	34.27	8.37	3.07	117.6							
	237	39.17	34.05	8.70	3.08	118.7							
Regroup #1	238	39.11	33.92	7.45	3.10	103.7							
	239	39.09	33.62	7.39	3.11	101.2							
ACM #2	240	39.03	33.40	7.83	3.12	116.7							
	241	39.01	33.31	7.37	3.13	117.5							
Regroup #2	242	38.96	33.18	6.98	3.15	100.9							
	243	38.94	33.01	6.68	3.16	99.7							
ACM #3	244	38.89	32.82	6.96	3.17	115.4							
	245	38.87	32.76	6.86	3.18	115.8							

1% Dehydration after 160 minutes
3% Dehydration after 210 minutes
% Dehydrated by the end of the simulation: 5.1%

Winter Ensemble with EAGLE
Cool Environment
ALERT 5 w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	68.2	Return to base	250	37.69	32.87	0.77	1.51	81.7
	10	37.11	34.28	0.00	0.00	78.0		255	37.69	32.90	1.09	1.52	82.0
	20	37.28	34.82	0.86	0.01	80.5		260	37.68	32.91	0.88	1.53	82.3
	30	37.41	35.40	0.96	0.03	84.4		265	37.66	32.93	0.66	1.53	83.0
	40	37.49	35.75	1.45	0.06	86.7		270	37.65	32.92	0.77	1.54	83.4
	50	37.57	35.99	1.88	0.09	89.6		275	37.64	32.90	0.85	1.55	83.4
Brief to launch	60	37.64	36.16	2.28	0.13	92.1	Secure/Inspect	280	37.64	31.60	0.43	1.55	85.2
	70	37.71	36.32	2.76	0.18	94.9	Aircraft	285	37.66	30.84	0.21	1.56	83.6
	80	37.78	36.45	3.25	0.24	97.4		290	37.69	30.37	0.05	1.56	82.5
	90	37.86	36.57	3.76	0.31	99.8		295	37.71	30.02	0.00	1.56	81.8
	100	37.93	36.68	4.30	0.39	102.1	Debrief	305	37.70	31.92	0.26	1.56	74.3
	110	38.02	36.85	5.06	0.48	104.4		315	37.64	32.63	0.10	1.57	75.2
	120	38.12	36.98	5.84	0.59	105.5		325	37.59	32.96	0.32	1.57	76.0
	130	38.22	37.08	6.59	0.72	106.2		335	37.56	33.21	0.44	1.58	77.0
	140	38.33	37.12	7.12	0.86	106.7		345	37.55	33.46	0.51	1.59	77.9
Aircraft	150	38.42	37.14	7.47	1.00	106.8		355	37.54	33.70	0.55	1.60	79.1
Inspection	155	38.47	36.50	6.47	1.07	111.0							
	160	38.47	36.19	5.77	1.13	107.0							
	165	38.44	35.95	5.25	1.18	103.8							
Alert Status:	170	38.40	35.74	4.82	1.23	101.5							
Open Canopy	180	38.25	35.36	3.78	1.31	86.7							
	190	38.12	34.85	3.06	1.37	84.2							
	200	38.00	33.78	2.30	1.42	82.4							
	210	37.91	32.72	1.88	1.45	78.5							
	220	37.84	31.86	1.38	1.47	76.9							
Close Canopy	226	37.80	31.42	0.99	1.48	76.0							
	227	37.80	31.44	0.95	1.49	76.1							
	228	37.80	31.46	0.85	1.49	76.0							
	229	37.79	31.48	0.81	1.49	76.0							
	230	37.79	31.50	0.76	1.49	75.9							
Flight to area	231	37.78	31.53	0.65	1.49	79.8							
	232	37.77	31.61	0.49	1.49	80.5							
	233	37.77	31.70	0.41	1.49	80.7							
	234	37.76	31.79	0.35	1.49	80.8							
	235	37.75	31.87	0.30	1.50	80.9							
ACM #1	236	37.74	31.94	0.00	1.50	103.3							
	237	37.73	32.04	0.00	1.50	104.8							
Regroup #1	238	37.72	32.12	0.00	1.50	89.7							
	239	37.71	32.19	0.22	1.50	89.5							
ACM #2	240	37.70	32.26	0.15	1.50	105.7							
	241	37.70	32.33	0.26	1.50	106.2							
Regroup #2	242	37.69	32.39	0.72	1.50	90.4							
	243	37.69	32.44	1.00	1.50	90.1							
ACM #3	244	37.69	32.52	0.74	1.50	106.6							
	245	37.69	32.57	0.92	1.50	107.0							

1% Dehydration after 130 minutes

% Dehydrated by the end of the simulation: 2.2%

Winter Ensemble with EAGLE
Warm Environment
ALERT 5 w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.2	Return to base	250	38.19	35.17	3.77	2.50	91.2
	10	37.11	34.28	0.00	0.00	78.0		255	38.15	34.90	3.52	2.53	90.5
	20	37.28	34.82	0.86	0.01	80.5		260	38.11	34.68	3.27	2.56	89.8
	30	37.41	35.40	0.96	0.03	84.4		265	38.06	34.51	3.01	2.59	89.3
	40	37.49	35.75	1.45	0.06	86.7		270	38.01	34.37	2.76	2.61	88.9
	50	37.57	35.99	1.88	0.09	89.6		275	37.97	34.27	2.51	2.64	88.6
Brief to launch	60	37.64	36.16	2.28	0.13	92.1	Secure/Inspect	280	37.93	34.28	2.50	2.66	94.0
	70	37.71	36.32	2.76	0.18	94.9	Aircraft	285	37.91	34.35	2.43	2.68	94.3
	80	37.78	36.45	3.25	0.24	97.4		290	37.89	34.41	2.39	2.70	94.5
	90	37.86	36.57	3.76	0.31	99.8		295	37.88	34.46	2.36	2.72	94.6
	100	37.93	36.68	4.30	0.39	102.1	Debrief	305	37.83	34.05	1.43	2.76	80.4
	110	38.02	36.85	5.06	0.48	104.4		315	37.77	33.70	1.92	2.78	81.9
	120	38.12	36.98	5.84	0.59	105.5		325	37.71	33.55	0.77	2.81	81.6
	130	38.22	37.08	6.59	0.72	106.2		335	37.66	33.37	0.42	2.82	80.3
	140	38.33	37.12	7.12	0.86	106.7		345	37.62	33.20	0.94	2.84	78.6
Aircraft	150	38.42	37.14	7.47	1.00	106.8		355	37.60	33.13	0.77	2.85	79.2
Inspection	155	38.49	37.32	9.01	1.09	114.4							
	160	38.57	37.46	10.16	1.18	115.9							
	165	38.67	37.56	11.17	1.29	115.6							
Alert Status:	170	38.77	37.49	11.79	1.41	115.6							
Open Canopy	180	38.91	37.20	10.01	1.65	109.2							
	190	38.88	36.89	8.33	1.83	105.3							
	200	38.76	36.53	7.06	1.99	99.4							
	210	38.62	36.23	6.11	2.11	94.9							
	220	38.47	35.98	5.34	2.22	91.9							
Close Canopy	226	38.37	35.88	4.99	2.28	90.7							
	227	38.36	35.98	4.99	2.29	91.2							
	228	38.35	36.07	5.03	2.30	91.5							
	229	38.34	36.14	5.07	2.31	92.2							
	230	38.33	36.19	5.09	2.32	92.7							
Flight to area	231	38.31	36.15	4.97	2.33	96.6							
	232	38.30	35.98	5.03	2.34	97.2							
	233	38.29	35.84	4.81	2.35	97.0							
	234	38.28	35.71	4.61	2.36	95.8							
	235	38.27	35.60	4.54	2.37	95.2							
ACM #1	236	38.26	35.49	4.80	2.38	116.4							
	237	38.25	35.45	5.37	2.39	118.3							
Regroup #1	238	38.24	35.48	4.93	2.39	105.8							
	239	38.24	35.46	4.50	2.40	104.1							
ACM #2	240	38.23	35.40	4.97	2.41	118.1							
	241	38.23	35.40	5.29	2.42	119.3							
Regroup #2	242	38.22	35.44	4.83	2.43	105.9							
	243	38.22	35.43	4.44	2.44	104.2							
ACM #3	244	38.22	35.37	4.89	2.45	118.3							
	245	38.21	35.38	5.20	2.46	119.3							

1% Dehydration after 130 minutes
3% Dehydration after 220 minutes
% Dehydrated by the end of the simulation: 3.9%

Winter Ensemble with EAGLE
Hot Environment
ALERT 5 w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.2	Return to base	250	40.25	36.67	14.79	4.75	111.0
	10	37.11	34.28	0.00	0.00	78.0		255	40.07	36.25	13.34	4.89	106.7
	20	37.28	34.82	0.86	0.01	80.5		260	39.88	35.88	12.13	5.01	103.2
	30	37.41	35.40	0.96	0.03	84.4		265	39.69	35.57	11.08	5.12	100.4
	40	37.49	35.75	1.45	0.06	86.7		270	39.51	35.30	10.14	5.22	98.3
	50	37.57	35.99	1.88	0.09	89.6		275	39.34	35.06	9.29	5.31	96.4
Brief to launch	60	37.64	36.16	2.28	0.13	92.1	Secure/Inspect	280	39.18	37.26	10.90	5.41	110.9
	70	37.71	36.32	2.76	0.18	94.9	Aircraft	285	39.14	37.55	12.24	5.53	115.4
	80	37.78	36.45	3.25	0.24	97.4		290	39.16	37.79	13.61	5.67	117.2
	90	37.86	36.57	3.76	0.31	99.8		295	39.22	37.82	14.47	5.82	117.0
	100	37.93	36.68	4.30	0.39	102.1	Debrief	305	39.19	35.72	8.40	6.04	94.5
	110	38.02	36.85	5.06	0.48	104.4		315	38.94	34.43	6.52	6.18	86.3
	120	38.12	36.98	5.84	0.59	105.5		325	38.69	33.50	5.22	6.27	83.2
	130	38.22	37.08	6.59	0.72	106.3		335	38.47	32.77	4.20	6.35	82.2
	140	38.33	37.12	7.12	0.86	106.7		345	38.30	32.15	3.07	6.41	78.8
Aircraft	150	38.42	37.14	7.47	1.00	106.8		355	38.17	31.59	2.68	6.45	77.2
Inspection	155	38.51	37.82	11.05	1.07	114.8							
	160	38.64	38.12	14.05	1.20	113.9							
	165	38.83	38.35	16.52	1.37	113.7							
Alert Status:	170	39.04	38.50	17.64	1.56	114.1							
Open Canopy	180	39.49	38.89	17.64	1.97	110.1							
	190	39.83	39.08	17.64	2.37	110.9							
	200	40.12	39.12	17.64	2.78	111.5							
	210	40.35	39.15	17.64	3.18	112.1							
	220	40.52	39.20	17.64	3.59	112.4							
Close Canopy	226	40.62	39.20	17.64	3.85	112.7							
	227	40.63	39.21	17.64	3.89	112.7							
	228	40.64	39.23	17.64	3.93	112.7							
	229	40.66	39.25	17.64	3.97	112.7							
	230	40.67	39.26	17.64	4.01	112.7							
Flight to area	231	40.69	38.98	17.64	4.06	115.9							
	232	40.70	38.49	17.64	4.10	116.3							
	233	40.70	38.15	17.64	4.14	117.0							
	234	40.70	37.93	17.64	4.17	117.7							
	235	40.70	37.77	17.64	4.21	118.5							
ACM #1	236	40.68	37.61	17.64	4.25	137.4							
	237	40.67	37.49	17.64	4.29	136.0							
Regroup #1	238	40.64	37.42	17.64	4.33	124.2							
	239	40.62	37.37	17.64	4.36	125.4							
ACM #2	240	40.58	37.28	17.64	4.40	137.9							
	241	40.56	37.20	17.64	4.44	136.7							
Regroup #2	242	40.52	37.16	17.64	4.47	124.1							
	243	40.50	37.13	17.64	4.51	124.1							
ACM #3	244	40.44	37.05	17.64	4.55	136.6							
	245	40.42	36.99	17.64	4.58	135.4							

1% Dehydration after 130 minutes
3% Dehydration after 190 minutes
6% Dehydration after 239 minutes
Threshold for critical loss of CNS function (SWT = 4.5 kg): 243 minutes
% Dehydrated by the end of the simulation: 8.9%

Summer EAGLE Ensemble
Cool Environment
ALERT 5 w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.2	Return to base	250	37.57	34.26	0.68	0.62	85.0
	10	37.11	34.35	0.00	0.00	79.0		255	37.57	34.38	0.60	0.63	86.8
	20	37.28	34.79	1.03	0.01	82.6		260	37.57	34.40	1.16	0.64	87.9
	30	37.40	35.27	0.54	0.03	82.8		265	37.57	34.43	1.19	0.65	87.2
	40	37.48	35.43	1.35	0.05	85.2		270	37.56	34.53	0.73	0.66	87.3
	50	37.54	35.58	1.34	0.08	86.3		275	37.56	34.62	0.74	0.67	89.0
Brief to launch	60	37.58	35.65	1.50	0.11	86.9	Secure/Inspect	280	37.57	34.16	1.01	0.68	92.7
	70	37.61	35.71	1.64	0.14	87.6	Aircraft	285	37.59	33.94	0.90	0.69	92.4
	80	37.64	35.75	1.75	0.17	88.0		290	37.61	33.89	0.71	0.70	92.4
	90	37.66	35.78	1.84	0.21	88.3		295	37.62	33.86	0.58	0.70	92.7
	100	37.68	35.79	1.92	0.24	88.4	Debrief	305	37.60	34.63	1.32	0.72	81.8
	110	37.69	35.81	1.98	0.28	88.6		315	37.58	35.01	0.71	0.74	83.2
	120	37.70	35.82	2.04	0.32	88.7		325	37.58	35.13	1.08	0.76	81.6
	130	37.71	35.83	2.09	0.36	88.8		335	37.58	35.28	1.35	0.78	85.2
	140	37.72	35.84	2.14	0.40	88.9		345	37.58	35.39	1.14	0.80	84.4
Aircraft	150	37.73	35.85	2.18	0.44	89.0		355	37.60	35.47	1.39	0.83	85.2
Inspection	155	37.74	35.23	2.01	0.46	97.2							
	160	37.76	34.87	1.79	0.48	95.9							
	165	37.76	34.64	1.65	0.50	95.0							
Alert Status:	170	37.76	34.47	1.53	0.51	94.4							
Open Canopy	180	37.71	34.25	1.01	0.54	82.9							
	190	37.66	33.95	0.35	0.56	80.5							
	200	37.61	33.64	0.55	0.57	79.8							
	210	37.57	33.37	0.59	0.58	78.9							
	220	37.55	33.12	0.53	0.59	78.1							
Close Canopy	226	37.54	33.00	0.42	0.59	77.7							
	227	37.53	33.02	0.33	0.60	78.0							
	228	37.53	33.03	0.23	0.60	77.7							
	229	37.53	33.03	0.37	0.60	77.6							
	230	37.53	33.05	0.36	0.60	77.9							
Flight to area	231	37.53	33.07	0.27	0.60	82.4							
	232	37.53	33.11	0.38	0.60	83.3							
	233	37.52	33.17	0.40	0.60	83.7							
	234	37.52	33.23	0.33	0.60	83.9							
	235	37.52	33.27	0.41	0.60	83.8							
ACM #1	236	37.52	33.32	0.26	0.60	108.6							
	237	37.52	33.37	0.51	0.60	110.1							
Regroup #1	238	37.53	33.45	0.85	0.60	93.8							
	239	37.53	33.57	0.47	0.61	94.3							
ACM #2	240	37.53	33.63	0.65	0.61	111.7							
	241	37.54	33.69	1.07	0.61	111.2							
Regroup #2	242	37.54	33.83	0.81	0.61	96.0							
	243	37.55	33.91	0.64	0.61	95.7							
ACM #3	244	37.55	33.94	1.11	0.61	112.4							
	245	37.56	34.04	1.20	0.62	113.1							

1% Dehydration after 305 minutes

% Dehydrated by the end of the simulation: 1.1%

Summer EAGLE Ensemble
Warm Environment
ALERT 5 w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.1	Return to base	250	38.55	36.31	6.33	1.64	103.5
	10	37.11	34.35	0.00	0.00	79.0		255	38.51	35.99	5.64	1.69	99.5
	20	37.28	34.79	1.03	0.01	82.6		260	38.46	35.69	5.09	1.74	96.6
	30	37.40	35.27	0.54	0.03	82.8		265	38.39	35.47	4.66	1.79	94.9
	40	37.48	35.43	1.35	0.05	85.3		270	38.33	35.28	4.27	1.83	93.4
	50	37.54	35.58	1.34	0.08	86.3		275	38.26	35.00	3.90	1.87	92.2
Brief to launch	60	37.58	35.65	1.50	0.11	86.9	Secure/Inspect	280	38.19	34.67	3.75	1.90	97.0
	70	37.61	35.71	1.64	0.14	87.6	Aircraft	285	38.15	34.60	3.58	1.94	96.7
	80	37.64	35.75	1.75	0.17	88.0		290	38.12	34.56	3.41	1.97	96.4
	90	37.66	35.78	1.84	0.21	88.3		295	38.09	34.39	3.13	2.00	95.6
	100	37.68	35.79	1.92	0.24	88.4	Debrief	305	37.99	34.01	1.89	2.04	80.8
	110	37.69	35.81	1.98	0.28	88.6		315	37.90	33.55	2.47	2.08	82.4
	120	37.70	35.82	2.04	0.32	88.7		325	37.82	33.31	0.97	2.10	81.8
	130	37.71	35.83	2.09	0.36	88.8		335	37.75	32.98	0.73	2.12	78.9
	140	37.72	35.84	2.14	0.40	88.9		345	37.71	32.71	1.13	2.14	77.9
Aircraft	150	37.73	35.85	2.18	0.44	89.0		355	37.67	32.52	0.96	2.16	77.8
Inspection	155	37.75	36.10	2.97	0.47	102.3							
	160	37.79	36.31	3.52	0.50	105.6							
	165	37.84	36.49	4.09	0.54	108.4							
Alert Status:	170	37.91	36.63	4.74	0.58	110.3							
Open Canopy	180	38.04	36.82	5.27	0.68	104.6							
	190	38.13	36.92	5.86	0.79	105.5							
	200	38.22	36.99	6.40	0.92	106.1							
	210	38.30	37.05	6.89	1.05	106.5							
	220	38.38	37.06	7.22	1.19	106.7							
Close Canopy	226	38.43	37.07	7.40	1.28	106.7							
	227	38.44	37.10	7.48	1.30	106.8							
	228	38.44	37.10	7.55	1.31	106.9							
	229	38.45	37.11	7.60	1.33	107.0							
	230	38.45	37.11	7.65	1.34	107.1							
Flight to area	231	38.47	37.01	7.55	1.36	110.0							
	232	38.47	36.91	7.45	1.37	110.0							
	233	38.48	36.86	7.29	1.39	109.7							
	234	38.48	36.82	7.14	1.40	109.5							
	235	38.48	36.75	7.00	1.42	109.1							
ACM #1	236	38.49	36.66	7.30	1.43	125.3							
	237	38.49	36.61	7.93	1.45	125.1							
Regroup #1	238	38.51	36.60	7.79	1.46	114.4							
	239	38.51	36.59	7.36	1.48	114.8							
ACM #2	240	38.52	36.56	7.62	1.49	126.1							
	241	38.52	36.53	8.06	1.51	125.5							
Regroup #2	242	38.53	36.53	7.84	1.52	114.7							
	243	38.54	36.53	7.38	1.54	114.9							
ACM #3	244	38.54	36.50	7.65	1.55	126.0							
	245	38.55	36.48	8.08	1.57	125.5							

1% Dehydration after 180 minutes
3% Dehydration after 355 minutes
% Dehydrated by the end of the simulation: 3.0%

Summer EAGLE Ensemble
Hot Environment
ALERT 5 w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.2	Return to base	250	39.20	35.17	8.58	3.31	95.1
	10	37.11	34.35	0.00	0.00	79.0		255	39.07	34.85	7.86	3.39	93.0
	20	37.28	34.79	1.03	0.01	82.6		260	38.95	34.61	7.19	3.45	91.5
	30	37.40	35.27	0.54	0.03	82.8		265	38.83	34.45	6.59	3.51	90.6
	40	37.48	35.43	1.35	0.05	85.3		270	38.72	34.38	6.06	3.57	90.0
	50	37.54	35.58	1.34	0.08	86.3		275	38.61	34.36	5.61	3.62	89.8
Brief to launch	60	37.58	35.65	1.50	0.11	86.9	Secure/Inspect	280	38.52	37.10	7.64	3.68	106.8
	70	37.61	35.71	1.64	0.14	87.6	Aircraft	285	38.54	37.57	9.65	3.77	113.4
	80	37.64	35.75	1.75	0.17	88.0		290	38.62	37.66	11.18	3.88	115.9
	90	37.66	35.78	1.84	0.21	88.3		295	38.73	37.42	12.07	4.00	115.9
	100	37.68	35.79	1.92	0.24	88.4	Debrief	305	38.73	34.40	5.47	4.15	86.0
	110	37.69	35.81	1.98	0.28	88.6		315	38.52	33.05	3.99	4.23	81.7
	120	37.70	35.82	2.04	0.32	88.7		325	38.32	32.27	3.66	4.28	79.3
	130	37.71	35.83	2.09	0.36	88.8		335	38.17	31.78	2.69	4.33	77.8
	140	37.72	35.84	2.14	0.40	88.9		345	38.06	31.50	2.09	4.36	76.8
Aircraft	150	37.73	35.85	2.18	0.44	89.0		355	37.95	31.28	1.38	4.39	76.1
Inspection	155	37.76	36.82	4.29	0.48	109.0							
	160	37.85	37.25	6.45	0.53	112.9							
	165	38.00	37.50	8.65	0.61	115.1							
Alert Status:	170	38.18	37.71	10.88	0.71	114.2							
Open Canopy	180	38.60	38.11	14.17	0.98	109.2							
	190	38.96	38.43	17.01	1.32	109.7							
	200	39.31	38.64	17.64	1.71	110.2							
	210	39.58	38.26	17.64	2.10	111.4							
	220	39.72	38.08	17.11	2.49	112.3							
Close Canopy	226	39.75	38.06	16.34	2.71	112.6							
	227	39.75	38.19	16.70	2.75	112.3							
	228	39.75	38.25	17.02	2.78	112.1							
	229	39.75	38.28	17.23	2.82	112.0							
	230	39.75	38.30	17.36	2.86	112.0							
Flight to area	231	39.76	37.55	16.59	2.90	115.4							
	232	39.75	37.02	14.87	2.93	116.5							
	233	39.75	36.72	13.27	2.96	115.5							
	234	39.73	36.50	12.31	2.99	113.2							
	235	39.71	36.31	11.76	3.01	111.0							
ACM #1	236	39.66	36.11	12.02	3.03	128.7							
	237	39.64	35.99	12.50	3.06	128.0							
Regroup #1	238	39.59	35.96	11.77	3.08	115.7							
	239	39.56	35.90	10.99	3.10	114.4							
ACM #2	240	39.51	35.76	11.23	3.12	126.9							
	241	39.49	35.70	11.48	3.14	126.8							
Regroup #2	242	39.44	35.70	10.84	3.16	113.6							
	243	39.41	35.66	10.20	3.18	111.5							
ACM #3	244	39.36	35.56	10.47	3.20	124.6							
	245	39.34	35.52	10.73	3.22	125.1							

1% Dehydration after 170 minutes
3% Dehydration after 210 minutes
6% Dehydration after 335 minutes

% Dehydrated by the end of the simulation: 6.1%

Summer ATAGS Ensemble
Cool Environment
ALERT 5 w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.1	Return to base	250	37.56	34.91	0.95	0.75	87.0
	10	37.11	34.27	0.00	0.00	79.0		255	37.56	34.99	1.02	0.76	88.8
	20	37.28	34.76	0.92	0.01	81.5		260	37.57	35.01	1.36	0.77	89.3
	30	37.39	35.29	0.51	0.03	83.8		265	37.57	35.05	1.31	0.78	89.0
	40	37.47	35.50	1.29	0.05	84.6		270	37.57	35.11	1.20	0.80	89.4
	50	37.53	35.69	1.37	0.07	86.4		275	37.57	35.16	1.29	0.81	90.2
Brief to launch	60	37.57	35.80	1.55	0.10	87.3	Secure/Inspect	280	37.59	34.65	1.18	0.82	91.3
	70	37.61	35.90	1.74	0.14	88.3	Aircraft	285	37.61	34.45	0.98	0.83	93.4
	80	37.65	35.97	1.90	0.17	89.0		290	37.62	34.34	0.96	0.84	93.5
	90	37.67	36.02	2.04	0.21	89.6		295	37.63	34.24	1.03	0.85	93.3
	100	37.70	36.06	2.18	0.25	90.1	Debrief	305	37.61	35.17	1.05	0.87	83.3
	110	37.72	36.10	2.31	0.30	90.6		315	37.60	35.43	1.35	0.89	82.5
	120	37.74	36.13	2.43	0.34	91.0		325	37.60	35.64	1.53	0.92	85.5
	130	37.76	36.17	2.55	0.39	91.5		335	37.61	35.79	1.60	0.95	86.3
	140	37.78	36.20	2.67	0.44	91.9		345	37.63	35.91	1.78	0.98	87.6
Aircraft	150	37.80	36.28	2.83	0.49	92.7		355	37.65	36.01	1.97	1.02	88.8
Inspection	155	37.82	35.71	2.64	0.52	99.9							
	160	37.84	35.41	2.41	0.54	98.1							
	165	37.84	35.23	2.25	0.57	97.0							
Alert Status:	170	37.83	35.08	2.11	0.59	96.2							
Open Canopy	180	37.78	34.87	1.72	0.62	83.8							
	190	37.72	34.52	1.41	0.65	81.1							
	200	37.67	34.29	1.46	0.67	83.1							
	210	37.62	34.08	0.41	0.69	81.5							
	220	37.57	33.82	0.30	0.70	80.2							
Close Canopy	226	37.54	33.69	0.28	0.71	80.0							
	227	37.54	33.65	0.80	0.71	80.2							
	228	37.54	33.72	0.55	0.71	81.1							
	229	37.54	33.73	0.21	0.71	80.1							
	230	37.53	33.69	0.70	0.71	80.0							
Flight to area	231	37.53	33.74	0.63	0.71	86.2							
	232	37.52	33.80	0.32	0.71	86.6							
	233	37.52	33.82	0.81	0.72	86.7							
	234	37.52	33.92	0.62	0.72	87.6							
	235	37.52	33.96	0.40	0.72	87.0							
ACM #1	236	37.51	33.97	0.71	0.72	112.7							
	237	37.51	34.02	0.95	0.72	114.2							
Regroup #1	238	37.51	34.13	0.96	0.72	98.0							
	239	37.52	34.23	0.71	0.72	97.7							
ACM #2	240	37.52	34.27	1.07	0.73	115.0							
	241	37.52	34.36	1.28	0.73	115.4							
Regroup #2	242	37.53	34.49	1.07	0.73	99.1							
	243	37.53	34.56	0.97	0.73	98.4							
ACM #3	244	37.54	34.60	1.34	0.73	115.5							
	245	37.54	34.69	1.52	0.74	116.0							

1% Dehydration after 240 minutes

% Dehydrated by the end of the simulation: 1.4%

Summer ATAGS Ensemble
Warm Environment
ALERT 5 w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.3	Return to base	250	38.62	36.12	6.31	1.97	100.2
	10	37.11	34.27	0.00	0.00	79.0		255	38.56	35.80	5.65	2.02	96.7
	20	37.28	34.76	0.92	0.01	81.5		260	38.49	35.53	5.12	2.07	94.5
	30	37.39	35.29	0.51	0.03	83.8		265	38.42	35.30	4.68	2.12	93.1
	40	37.47	35.50	1.29	0.05	84.6		270	38.34	35.10	4.30	2.16	92.1
	50	37.53	35.69	1.37	0.07	86.4		275	38.27	34.92	3.96	2.20	91.3
Brief to launch	60	37.57	35.80	1.55	0.10	87.3	Secure/Inspect	280	38.21	34.49	3.75	2.23	96.2
	70	37.61	35.90	1.74	0.14	88.3	Aircraft	285	38.16	34.25	3.51	2.26	95.7
	80	37.65	35.97	1.90	0.17	89.0		290	38.12	34.13	3.29	2.29	95.2
	90	37.67	36.02	2.04	0.21	89.6		295	38.09	34.04	3.08	2.32	94.9
	100	37.70	36.06	2.18	0.25	90.1	Debrief	305	37.99	33.79	1.78	2.36	80.8
	110	37.72	36.10	2.31	0.30	90.6		315	37.91	33.33	2.34	2.40	81.4
	120	37.74	36.13	2.43	0.34	91.0		325	37.82	33.06	1.37	2.42	81.7
	130	37.76	36.17	2.55	0.39	91.5		335	37.76	32.71	0.80	2.45	78.6
	140	37.78	36.20	2.67	0.44	91.9		345	37.72	32.43	0.98	2.46	77.5
Aircraft	150	37.80	36.28	2.83	0.49	92.7		355	37.69	32.20	0.91	2.48	77.1
Inspection	155	37.83	36.55	3.90	0.53	106.8							
	160	37.89	36.77	4.77	0.57	110.4							
	165	37.97	36.90	5.59	0.62	111.7							
Alert Status:	170	38.06	37.01	6.39	0.68	112.5							
Open Canopy	180	38.25	37.19	7.16	0.82	107.3							
	190	38.38	37.27	7.93	0.97	108.2							
	200	38.50	37.32	8.50	1.14	108.7							
	210	38.59	37.29	8.75	1.32	108.6							
	220	38.65	37.19	8.44	1.49	107.6							
Close Canopy	226	38.66	37.15	8.16	1.60	106.8							
	227	38.66	37.19	8.24	1.61	106.9							
	228	38.66	37.22	8.34	1.63	107.1							
	229	38.66	37.23	8.41	1.65	107.3							
	230	38.66	37.23	8.46	1.66	107.4							
Flight to area	231	38.67	37.09	8.34	1.68	110.3							
	232	38.67	36.94	8.14	1.70	110.1							
	233	38.67	36.85	7.84	1.71	109.7							
	234	38.66	36.79	7.61	1.73	109.1							
	235	38.66	36.73	7.44	1.74	108.4							
ACM #1	236	38.66	36.66	7.82	1.76	125.0							
	237	38.66	36.62	8.47	1.78	124.8							
Regroup #1	238	38.65	36.58	8.19	1.79	114.2							
	239	38.65	36.56	7.66	1.81	114.3							
ACM #2	240	38.65	36.52	7.93	1.82	125.7							
	241	38.65	36.49	8.34	1.84	125.1							
Regroup #2	242	38.65	36.50	8.01	1.85	114.1							
	243	38.65	36.50	7.50	1.87	113.9							
ACM #3	244	38.65	36.44	7.80	1.88	125.5							
	245	38.65	36.40	8.20	1.90	125.0							

1% Dehydration after 170 minutes
3% Dehydration after 270 minutes
% Dehydrated by the end of the simulation: 3.4%

Summer ATAGS Ensemble
Hot Environment
ALERT 5 w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	68.2	Return to base	250	40.14	37.27	15.04	3.87	114.2
	10	37.11	34.27	0.00	0.00	79.0		255	40.01	37.04	13.69	4.02	111.7
	20	37.28	34.76	0.92	0.01	81.5		260	39.86	36.83	12.62	4.16	109.7
	30	37.39	35.29	0.51	0.03	83.9		265	39.70	36.62	11.66	4.28	107.2
	40	37.47	35.50	1.29	0.05	84.6		270	39.55	36.42	10.80	4.39	104.8
	50	37.53	35.69	1.37	0.07	86.4		275	39.40	36.23	10.01	4.49	102.7
Brief to launch	60	37.57	35.80	1.55	0.10	87.3	Secure/Inspect	280	39.28	37.87	13.43	4.62	116.8
	70	37.61	35.90	1.74	0.14	88.3	Aircraft	285	39.31	37.94	15.19	4.78	117.0
	80	37.65	35.97	1.90	0.17	89.0		290	39.39	38.00	16.55	4.95	116.5
	90	37.67	36.02	2.04	0.21	89.6		295	39.49	37.80	17.20	5.14	116.7
	100	37.70	36.06	2.18	0.25	90.1	Debrief	305	39.46	36.08	9.65	5.40	97.9
	110	37.72	36.10	2.31	0.30	90.6		315	39.15	34.89	7.50	5.55	87.9
	120	37.74	36.13	2.43	0.34	91.0		325	38.86	34.00	6.06	5.67	84.3
	130	37.76	36.17	2.55	0.39	91.5		335	38.62	33.31	4.89	5.76	82.8
	140	37.78	36.20	2.67	0.44	91.9		345	38.41	32.70	4.17	5.83	81.0
Aircraft	150	37.80	36.28	2.83	0.49	92.7		355	38.25	32.25	3.46	5.88	79.1
Inspection	155	37.85	37.11	5.37	0.53	111.1							
	160	37.96	37.45	7.86	0.60	114.8							
	165	38.12	37.69	10.28	0.69	114.3							
Alert Status:	170	38.32	37.93	12.61	0.81	113.8							
Open Canopy	180	38.78	38.37	16.11	1.13	109.3							
	190	39.16	38.70	17.64	1.51	109.8							
	200	39.54	38.93	17.64	1.91	110.4							
	210	39.84	38.72	17.64	2.31	111.4							
	220	40.06	38.75	17.64	2.72	111.8							
Close Canopy	226	40.18	39.03	17.64	2.97	112.0							
	227	40.20	39.18	17.64	3.01	111.7							
	228	40.22	39.26	17.64	3.05	111.5							
	229	40.24	39.31	17.64	3.09	111.6							
	230	40.26	39.35	17.64	3.13	111.6							
Flight to area	231	40.30	38.80	17.64	3.17	114.8							
	232	40.32	38.32	17.64	3.21	115.4							
	233	40.33	38.07	17.64	3.25	116.0							
	234	40.33	37.91	17.64	3.29	116.7							
	235	40.33	37.79	17.64	3.33	117.2							
ACM #1	236	40.34	37.70	17.64	3.37	134.9							
	237	40.34	37.64	17.64	3.40	133.7							
Regroup #1	238	40.33	37.61	17.64	3.44	122.4							
	239	40.32	37.60	17.64	3.48	123.4							
ACM #2	240	40.31	37.54	17.64	3.52	135.7							
	241	40.30	37.49	17.64	3.55	134.4							
Regroup #2	242	40.29	37.47	17.64	3.59	122.9							
	243	40.28	37.46	17.64	3.63	124.2							
ACM #3	244	40.25	37.42	17.64	3.67	136.4							
	245	40.24	37.38	17.64	3.70	135.0							

1% Dehydration after 165 minutes
3% Dehydration after 200 minutes
6% Dehydration after 270 minutes
Threshold for critical loss of CNS function (SWT = 4.5 kg): 275 minutes
% Dehydrated by the end of the simulation: 8.1%

Summer ATAGS with additional arm coverage Ensemble
Cool Environment
ALERT 5 w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.1	Return to base	250	37.61	34.50	1.00	1.02	85.5
	10	37.11	34.28	0.00	0.00	79.0		255	37.60	34.57	0.82	1.03	87.0
	20	37.28	34.82	0.98	0.01	81.7		260	37.60	34.58	1.26	1.05	88.3
	30	37.40	35.43	0.64	0.03	84.3		265	37.59	34.55	1.50	1.06	87.7
	40	37.48	35.72	1.34	0.05	85.8		270	37.59	34.58	1.09	1.07	87.0
	50	37.54	35.93	1.63	0.08	88.1		275	37.58	34.64	0.70	1.08	87.9
Brief to launch	60	37.60	36.06	1.90	0.12	89.6	Secure/Inspect	280	37.59	33.76	0.62	1.08	92.0
	70	37.65	36.16	2.18	0.16	91.1	Aircraft	285	37.60	33.34	0.46	1.09	90.9
	80	37.70	36.24	2.43	0.20	92.3		290	37.61	33.01	0.73	1.10	88.9
	90	37.74	36.30	2.68	0.25	93.4		295	37.63	32.76	0.61	1.10	87.7
	100	37.78	36.36	2.91	0.31	94.3	Debrief	305	37.62	34.16	1.04	1.12	79.0
	110	37.82	36.42	3.15	0.37	95.2		315	37.59	34.63	0.49	1.13	79.8
	120	37.86	36.51	3.42	0.43	96.3		325	37.57	34.87	1.27	1.15	80.8
	130	37.90	36.61	3.83	0.50	98.6		335	37.56	35.17	0.77	1.17	83.0
	140	37.95	36.69	4.22	0.58	100.4		345	37.55	35.28	1.31	1.19	82.2
Aircraft	150	38.01	36.73	4.52	0.67	101.4		355	37.56	35.47	1.17	1.21	84.8
Inspection	155	38.04	36.11	4.02	0.71	104.8							
	160	38.05	35.82	3.63	0.75	101.6							
	165	38.05	35.62	3.34	0.78	99.7							
Alert Status:	170	38.03	35.45	3.11	0.81	98.4							
Open Canopy	180	37.94	35.15	2.49	0.86	85.0							
	190	37.86	34.65	1.90	0.90	82.7							
	200	37.79	34.33	1.63	0.93	83.1							
	210	37.72	33.89	0.66	0.95	80.7							
	220	37.66	33.44	0.72	0.97	79.8							
Close Canopy	226	37.62	33.21	0.65	0.98	78.2							
	227	37.62	33.21	0.95	0.98	78.4							
	228	37.62	33.26	0.71	0.98	78.8							
	229	37.61	33.27	0.60	0.98	78.3							
	230	37.61	33.26	0.87	0.99	78.2							
Flight to area	231	37.60	33.31	0.74	0.99	83.3							
	232	37.60	33.38	0.64	0.99	84.0							
	233	37.60	33.43	0.91	0.99	84.2							
	234	37.60	33.51	0.80	0.99	84.7							
	235	37.59	33.56	0.70	0.99	84.5							
ACM #1	236	37.59	33.59	0.69	0.99	109.5							
	237	37.59	33.64	0.92	1.00	111.1							
Regroup #1	238	37.59	33.73	1.25	1.00	94.9							
	239	37.59	33.85	0.82	1.00	95.5							
ACM #2	240	37.59	33.90	1.02	1.00	112.9							
	241	37.59	33.97	1.41	1.00	112.5							
Regroup #2	242	37.59	34.10	1.18	1.01	96.9							
	243	37.59	34.18	1.01	1.01	96.5							
ACM #3	244	37.60	34.21	1.42	1.01	113.3							
	245	37.60	34.30	1.52	1.01	113.9							

1% Dehydration after 155 minutes

% Dehydrated by the end of the simulation: 1.7%

Summer ATAGS with additional arm coverage Ensemble
Warm Environment
ALERT 5 w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.2	Return to base	250	38.53	36.10	6.01	2.27	99.3
	10	37.11	34.28	0.00	0.00	79.0		255	38.48	35.84	5.47	2.33	96.6
	20	37.28	34.82	0.98	0.01	81.7		260	38.43	35.63	5.03	2.38	95.0
	30	37.40	35.43	0.64	0.03	84.3		265	38.36	35.40	4.58	2.42	93.4
	40	37.48	35.72	1.34	0.05	85.8		270	38.30	35.19	4.21	2.46	92.3
	50	37.54	35.93	1.63	0.08	88.1		275	38.23	35.01	3.89	2.50	91.5
Brief to launch	60	37.60	36.06	1.90	0.12	89.6	Secure/Inspect	280	38.17	34.34	3.56	2.53	95.7
	70	37.65	36.16	2.18	0.16	91.1	Aircraft	285	38.13	34.13	3.32	2.56	95.0
	80	37.70	36.24	2.43	0.20	92.3		290	38.09	33.99	3.12	2.59	94.5
	90	37.74	36.30	2.68	0.25	93.4		295	38.05	33.87	2.94	2.61	94.1
	100	37.78	36.36	2.91	0.31	94.3	Debrief	305	37.96	33.78	1.34	2.65	80.9
	110	37.82	36.42	3.15	0.37	95.2		315	37.87	33.36	1.91	2.68	80.1
	120	37.86	36.51	3.42	0.43	96.3		325	37.79	33.04	1.82	2.71	79.5
	130	37.90	36.61	3.83	0.50	98.6		335	37.73	32.78	0.94	2.73	78.7
	140	37.95	36.69	4.22	0.58	100.4		345	37.69	32.48	0.67	2.74	77.5
Aircraft	150	38.01	36.73	4.53	0.67	101.5		355	37.66	32.21	0.80	2.76	76.8
Inspection	155	38.06	36.96	5.89	0.72	111.6							
	160	38.14	37.11	6.91	0.78	112.8							
	165	38.23	37.22	7.86	0.86	113.9							
Alert Status:	170	38.34	37.27	8.61	0.94	114.7							
Open Canopy	180	38.53	37.41	9.20	1.13	109.7							
	190	38.65	37.35	9.34	1.32	109.3							
	200	38.71	37.28	8.96	1.51	108.1							
	210	38.73	37.13	8.51	1.69	107.0							
	220	38.69	36.85	7.51	1.85	104.5							
Close Canopy	226	38.63	36.82	7.08	1.94	102.3							
	227	38.63	36.97	7.32	1.95	103.3							
	228	38.62	37.06	7.55	1.97	104.5							
	229	38.62	37.13	7.71	1.98	105.3							
	230	38.61	37.17	7.86	2.00	105.8							
Flight to area	231	38.60	36.98	7.76	2.01	109.1							
	232	38.60	36.78	7.47	2.03	108.8							
	233	38.60	36.65	7.10	2.04	107.7							
	234	38.59	36.55	6.87	2.06	106.4							
	235	38.59	36.47	6.71	2.07	105.2							
ACM #1	236	38.58	36.40	7.09	2.08	122.8							
	237	38.57	36.37	7.76	2.10	123.6							
Regroup #1	238	38.57	36.39	7.47	2.11	112.9							
	239	38.57	36.40	6.98	2.13	112.6							
ACM #2	240	38.56	36.36	7.32	2.14	124.4							
	241	38.56	36.35	7.76	2.15	124.3							
Regroup #2	242	38.56	36.38	7.44	2.17	113.2							
	243	38.56	36.38	6.94	2.18	112.6							
ACM #3	244	38.55	36.35	7.29	2.20	124.4							
	245	38.55	36.34	7.74	2.21	124.3							

1% Dehydration after 155 minutes
3% Dehydration after 243 minutes
% Dehydrated by the end of the simulation: 3.8%

Summer ATAGS with additional arm coverage Ensemble
Hot Environment
ALERT 5 w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	68.2	Return to base	250	41.57	39.02	17.64	4.47	119.0
	10	37.11	34.28	0.00	0.00	79.0		255	41.50	38.90	17.64	4.68	119.2
	20	37.28	34.82	0.98	0.01	81.7		260	41.41	38.78	17.64	4.88	119.4
	30	37.40	35.43	0.64	0.03	84.3		265	41.30	38.68	17.64	5.08	119.5
	40	37.48	35.72	1.34	0.05	85.8		270	41.18	38.58	17.64	5.28	119.4
	50	37.54	35.93	1.63	0.08	88.1		275	41.07	38.49	17.64	5.48	119.3
Brief to launch	60	37.60	36.06	1.90	0.12	89.6	Secure/Inspect	280	40.98	39.58	17.64	5.70	118.6
	70	37.65	36.16	2.18	0.16	91.1	Aircraft	285	41.02	39.64	17.64	5.92	118.1
	80	37.70	36.24	2.43	0.20	92.3		290	41.11	39.72	17.64	6.13	118.1
	90	37.74	36.30	2.68	0.25	93.4		295	41.22	39.87	17.64	6.35	118.1
	100	37.78	36.36	2.91	0.31	94.3	Debrief	305	41.23	38.31	17.64	6.75	116.1
	110	37.82	36.42	3.15	0.37	95.2		315	40.87	37.77	17.64	7.14	112.7
	120	37.86	36.51	3.42	0.43	96.3		325	40.40	37.13	14.87	7.48	106.5
	130	37.90	36.61	3.83	0.50	98.6		335	39.95	36.47	12.39	7.75	99.1
	140	37.95	36.69	4.22	0.58	100.4		345	39.56	35.84	10.32	7.96	93.4
Aircraft	150	38.01	36.73	4.52	0.67	101.4		355	39.22	35.24	8.57	8.14	89.3
Inspection	155	38.07	37.44	7.63	0.73	113.7							
	160	38.21	37.74	10.37	0.82	114.5							
	165	38.39	38.00	12.91	0.94	113.8							
Alert Status:	170	38.60	38.24	15.28	1.09	113.5							
Open Canopy	180	39.08	38.79	17.64	1.48	109.5							
	190	39.51	39.30	17.64	1.89	110.0							
	200	39.96	39.73	17.64	2.30	110.7							
	210	40.41	40.04	17.64	2.73	111.4							
	220	40.84	40.33	17.64	3.17	112.1							
Close Canopy	226	41.14	40.56	17.64	3.44	112.5							
	227	41.17	40.65	17.64	3.49	112.5							
	228	41.21	40.71	17.64	3.53	112.5							
	229	41.25	40.76	17.64	3.58	112.5							
	230	41.28	40.80	17.64	3.63	112.6							
Flight to area	231	41.37	40.29	17.64	3.67	115.9							
	232	41.40	39.83	17.64	3.72	116.4							
	233	41.43	39.58	17.64	3.76	116.9							
	234	41.45	39.43	17.64	3.80	117.3							
	235	41.47	39.34	17.64	3.85	117.6							
ACM #1	236	41.51	39.26	17.64	3.89	136.1							
	237	41.52	39.21	17.64	3.93	135.4							
Regroup #1	238	41.55	39.19	17.64	3.97	123.7							
	239	41.56	39.18	17.64	4.01	124.4							
ACM #2	240	41.57	39.15	17.64	4.06	136.6							
	241	41.58	39.12	17.64	4.10	135.9							
Regroup #2	242	41.59	39.12	17.64	4.14	124.1							
	243	41.59	39.13	17.64	4.18	124.8							
ACM #3	244	41.59	39.11	17.64	4.22	137.2							
	245	41.60	39.08	17.64	4.26	136.4							

1% Dehydration after 155 minutes
3% Dehydration after 190 minutes
6% Dehydration after 245 minutes
11% Dehydration after 335 minutes
Threshold for critical loss of CNS function (SWT = 4.5 kg): 250 minutes
% Dehydrated by the end of the simulation: 11.2%

Winter Control Ensemble
Cool Environment
Normal Operations w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.3	On Station	230	37.83	35.68	2.75	1.05	94.8
	10	37.11	34.27	0.00	0.00	77.9		240	37.81	35.61	2.66	1.10	95.0
	20	37.28	34.77	0.81	0.01	80.3		250	37.80	35.55	2.55	1.15	94.6
	30	37.41	35.29	0.84	0.03	84.1		260	37.78	35.48	2.44	1.19	94.1
	40	37.49	35.57	1.25	0.05	85.2		270	37.76	35.42	2.34	1.24	93.8
	50	37.55	35.75	1.56	0.08	87.2		280	37.75	35.36	2.26	1.28	93.5
Brief to launch	60	37.60	35.86	1.77	0.11	88.6	ACM #1	290	37.73	35.30	2.16	1.33	93.1
	70	37.64	35.95	1.99	0.15	89.8		291	37.73	35.29	2.37	1.33	115.8
	80	37.68	36.03	2.18	0.19	90.6	Regroup #1	292	37.74	35.30	2.95	1.33	117.2
	90	37.71	36.08	2.36	0.24	91.4		293	37.75	35.38	2.79	1.34	104.4
	100	37.74	36.13	2.53	0.28	92.0	ACM #2	294	37.75	35.44	2.43	1.34	103.3
	110	37.77	36.18	2.70	0.34	92.6		295	37.76	35.44	2.86	1.35	118.1
	120	37.80	36.23	2.87	0.39	93.3	Regroup #2	296	37.76	35.47	3.29	1.36	119.0
	130	37.82	36.32	3.07	0.45	94.2		297	37.78	35.55	3.06	1.36	105.9
	140	37.85	36.42	3.38	0.51	95.9	ACM #3	298	37.78	35.59	2.73	1.37	104.7
Aircraft	150	37.89	36.49	3.68	0.58	97.5		299	37.79	35.59	3.12	1.37	119.1
Inspection	155	37.93	35.97	3.49	0.62	103.6	Return to base	300	37.80	35.61	3.55	1.38	119.9
	160	37.94	35.73	3.25	0.65	101.4		305	37.82	35.62	2.61	1.40	93.6
	165	37.95	35.59	3.07	0.68	100.1		310	37.82	35.52	2.53	1.43	92.8
Wait to launch	170	37.95	35.47	2.93	0.70	99.1		315	37.82	35.44	2.40	1.45	92.4
	175	37.93	35.81	2.79	0.73	88.5		320	37.81	35.37	2.31	1.47	92.1
	180	37.91	36.05	2.96	0.76	89.7		325	37.79	35.31	2.23	1.50	91.9
	185	37.89	36.17	3.06	0.79	91.1	Secure/Inspect	330	37.78	35.25	2.15	1.52	91.7
	190	37.89	36.25	3.17	0.82	92.2	Aircraft	335	37.78	34.58	1.85	1.54	94.4
	195	37.89	36.28	3.25	0.85	93.0		340	37.78	34.22	1.57	1.55	93.9
Close Canopy	196	37.89	36.23	3.26	0.86	93.3		345	37.77	33.97	1.41	1.57	93.4
	197	37.89	36.17	3.27	0.86	93.6		350	37.76	33.75	1.32	1.58	93.1
	198	37.89	36.09	3.14	0.87	93.1	Debrief	360	37.71	34.66	1.31	1.60	83.4
	199	37.89	36.01	3.05	0.87	92.3		370	37.67	34.92	1.15	1.63	81.0
Initial Flight	200	37.89	35.95	3.00	0.88	91.7		380	37.65	35.09	1.70	1.65	85.1
	205	37.88	35.85	3.04	0.91	96.6		390	37.63	35.19	1.14	1.68	82.4
	210	37.87	35.83	2.98	0.94	96.2		400	37.63	35.26	1.68	1.71	85.3
Flight to area	215	37.86	35.79	2.93	0.97	95.8		410	37.63	35.34	1.38	1.74	84.5
	220	37.85	35.75	2.87	0.99	95.5							
	225	37.84	35.71	2.81	1.02	95.1							

1% Dehydration after 175 minutes

% Dehydrated by the end of the simulation: 2.4%

Winter Control Ensemble
Warm Environment
Normal Operations w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.1	On Station	230	38.41	36.00	5.21	1.62	99.7
	10	37.11	34.27	0.00	0.00	77.9		240	38.29	35.46	4.32	1.71	95.5
	20	37.28	34.77	0.81	0.01	80.3		250	38.17	35.02	3.65	1.79	93.0
	30	37.41	35.29	0.84	0.03	84.1		260	38.06	34.68	3.14	1.85	91.7
	40	37.49	35.57	1.25	0.05	85.2		270	37.98	34.45	2.73	1.90	90.9
	50	37.55	35.75	1.56	0.08	87.2		280	37.90	34.31	2.42	1.95	90.5
Brief to launch	60	37.60	35.86	1.77	0.11	88.6	ACM #1	290	37.84	34.24	2.17	1.99	90.2
	70	37.64	35.95	1.99	0.15	89.8		291	37.83	34.22	2.29	1.99	114.2
	80	37.68	36.03	2.18	0.19	90.6	Regroup #1	292	37.83	34.25	2.83	2.00	115.2
	90	37.71	36.08	2.36	0.24	91.4		293	37.83	34.37	2.45	2.00	100.9
	100	37.74	36.13	2.53	0.28	92.0	ACM #2	294	37.83	34.42	2.22	2.01	99.7
	110	37.77	36.18	2.70	0.34	92.6		295	37.83	34.42	2.83	2.01	115.8
	120	37.80	36.23	2.87	0.39	93.3	Regroup #2	296	37.84	34.51	2.96	2.02	116.8
	130	37.82	36.32	3.07	0.45	94.2		297	37.84	34.63	2.62	2.02	101.8
	140	37.85	36.42	3.38	0.51	95.9	ACM #3	298	37.84	34.67	2.45	2.03	100.7
Aircraft	150	37.89	36.49	3.68	0.58	97.5		299	37.84	34.67	2.93	2.03	116.6
Inspection	155	37.94	36.72	4.89	0.62	110.1	Return to base	300	37.85	34.73	3.18	2.04	117.4
	160	38.00	36.90	5.81	0.67	111.6		305	37.85	34.74	2.21	2.06	89.0
	165	38.09	37.03	6.68	0.74	112.6		310	37.84	34.65	2.09	2.08	89.5
Wait to launch	170	38.19	37.13	7.52	0.81	113.5		315	37.83	34.56	2.09	2.10	89.8
	175	38.31	37.07	7.08	0.89	106.4		320	37.81	34.51	2.07	2.12	89.7
	180	38.37	37.01	6.81	0.96	105.7		325	37.79	34.48	1.99	2.14	89.6
	185	38.40	36.99	6.68	1.03	105.3	Secure/Inspect	330	37.77	34.47	1.88	2.16	89.4
	190	38.42	36.97	6.59	1.09	104.9	Aircraft	335	37.76	34.77	2.10	2.18	95.2
	195	38.43	36.92	6.45	1.16	104.5		340	37.77	35.03	2.24	2.20	96.4
Close Canopy	196	38.43	36.91	6.72	1.17	105.1		345	37.78	35.21	2.38	2.22	97.3
	197	38.43	36.96	6.81	1.18	105.5		350	37.79	35.33	2.49	2.24	98.0
	198	38.43	37.02	6.89	1.20	105.7	Debrief	360	37.79	34.90	1.79	2.28	84.2
	199	38.43	37.07	7.03	1.21	105.9		370	37.76	34.55	1.70	2.32	83.5
Initial Flight	200	38.43	37.11	7.18	1.23	106.1		380	37.72	34.31	1.52	2.34	81.5
	205	38.45	36.99	7.29	1.30	109.7		390	37.68	34.31	0.88	2.37	83.5
	210	38.46	36.92	7.13	1.37	109.3		400	37.65	34.19	1.03	2.39	80.7
Flight to area	215	38.47	36.78	6.83	1.44	108.4		410	37.62	34.29	0.93	2.41	83.5
	220	38.46	36.63	6.46	1.51	107.0							
	225	38.44	36.31	5.81	1.57	103.5							

1% Dehydration after 165 minutes
3% Dehydration after 290 minutes
% Dehydrated by the end of the simulation: 3.3%

Winter Control Ensemble
Hot Environment
Normal Operations w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	68.2	On Station	230	38.45	34.90	4.72	2.00	92.6
	10	37.11	34.27	0.00	0.00	77.9		240	38.27	34.37	3.92	2.08	91.1
	20	37.28	34.77	0.81	0.01	80.3		250	38.14	34.03	3.36	2.15	90.2
	30	37.41	35.29	0.84	0.03	84.1		260	38.03	33.85	3.12	2.20	90.0
	40	37.49	35.57	1.25	0.05	85.2		270	37.94	33.78	2.79	2.25	88.6
	50	37.55	35.75	1.56	0.08	87.2		280	37.86	33.96	1.58	2.29	89.5
Brief to launch	60	37.60	35.86	1.77	0.11	88.6	ACM #1	290	37.80	34.13	2.09	2.33	91.1
	70	37.64	35.95	1.99	0.15	89.8		291	37.79	34.13	1.81	2.33	115.0
	80	37.68	36.03	2.18	0.19	90.6	Regroup #1	292	37.79	34.13	3.00	2.34	114.6
	90	37.71	36.08	2.36	0.24	91.4		293	37.79	34.31	2.19	2.34	100.8
	100	37.74	36.13	2.53	0.28	92.0	ACM #2	294	37.79	34.35	2.08	2.34	99.0
	110	37.77	36.18	2.70	0.34	92.6		295	37.79	34.37	2.92	2.35	115.3
	120	37.80	36.23	2.87	0.39	93.3	Regroup #2	296	37.80	34.50	2.78	2.35	116.7
	130	37.82	36.32	3.07	0.45	94.2		297	37.80	34.62	2.58	2.36	101.3
	140	37.85	36.42	3.38	0.51	95.9	ACM #3	298	37.80	34.68	2.44	2.36	100.6
Aircraft	150	37.89	36.49	3.68	0.58	97.5		299	37.81	34.70	2.88	2.37	116.4
Inspection	155	37.95	37.24	6.42	0.64	112.3	Return to base	300	37.81	34.78	3.18	2.37	117.4
	160	38.07	37.56	8.90	0.72	115.1		305	37.82	34.86	2.24	2.40	89.1
	165	38.24	37.79	11.30	0.82	114.2		310	37.82	34.84	2.17	2.42	90.1
Wait to launch	170	38.44	38.02	13.53	0.95	113.7		315	37.81	34.83	2.23	2.44	90.4
	175	38.69	37.63	12.29	1.11	109.6		320	37.80	34.84	2.22	2.46	90.4
	180	38.79	37.45	10.81	1.23	110.7		325	37.78	34.88	2.15	2.48	90.6
	185	38.84	37.32	9.91	1.33	108.7	Secure/Inspect	330	37.77	34.93	2.10	2.50	90.8
	190	38.86	37.12	8.92	1.43	106.9	Aircraft	335	37.78	36.41	3.54	2.53	102.5
	195	38.83	36.81	7.82	1.51	103.8		340	37.83	36.96	5.29	2.57	111.0
Close Canopy	196	38.81	36.85	8.29	1.53	104.4		345	37.94	37.13	6.80	2.63	113.1
	197	38.81	37.09	8.48	1.55	105.6		350	38.07	37.20	7.93	2.71	114.4
	198	38.80	37.30	8.84	1.56	106.4	Debrief	360	38.18	34.78	3.09	2.80	85.9
	199	38.80	37.44	9.33	1.58	107.2		370	38.07	33.43	2.13	2.85	82.1
Initial Flight	200	38.79	37.54	9.77	1.60	108.1		380	37.94	32.56	2.13	2.88	78.7
	205	38.79	36.82	8.46	1.70	110.2		390	37.86	32.09	1.35	2.91	77.8
	210	38.76	36.48	7.42	1.77	106.0		400	37.79	31.76	0.81	2.92	76.8
Flight to area	215	38.70	36.08	6.61	1.84	101.4		410	37.74	31.58	0.76	2.94	76.1
	220	38.61	35.68	5.89	1.90	97.6							
	225	38.53	35.27	5.25	1.96	94.6							

1% Dehydration after 160 minutes
3% Dehydration after 250 minutes
% Dehydrated by the end of the simulation: 4.1%

Winter Ensemble with EAGLE
Cool Environment
Normal Operations w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.2	On Station	230	37.89	33.90	2.12	1.65	89.0
	10	37.11	34.28	0.00	0.00	78.0		240	37.82	33.55	1.80	1.69	89.1
	20	37.28	34.82	0.86	0.01	80.5		250	37.77	33.29	1.65	1.72	88.8
	30	37.41	35.40	0.96	0.03	84.4		260	37.72	33.11	1.38	1.74	87.9
	40	37.49	35.75	1.45	0.06	86.7		270	37.68	33.04	0.77	1.76	88.8
	50	37.57	35.99	1.88	0.09	89.6		280	37.65	32.81	1.18	1.78	87.9
Brief to launch	60	37.64	36.16	2.28	0.13	92.1	ACM #1	290	37.63	32.67	0.61	1.80	85.7
	70	37.71	36.32	2.76	0.18	94.9		291	37.63	32.62	0.75	1.80	109.3
	80	37.78	36.45	3.25	0.24	97.4	Regroup #1	292	37.63	32.60	1.09	1.80	109.7
	90	37.86	36.57	3.76	0.31	99.8		293	37.64	32.67	1.18	1.80	94.2
	100	37.93	36.68	4.30	0.39	102.1	ACM #2	294	37.64	32.74	0.79	1.80	94.3
	110	38.02	36.85	5.06	0.48	104.4		295	37.65	32.74	1.09	1.80	110.7
	120	38.12	36.98	5.84	0.59	105.6	Regroup #2	296	37.65	32.79	1.36	1.81	110.5
	130	38.22	37.08	6.59	0.72	106.3		297	37.66	32.89	1.16	1.81	95.5
	140	38.33	37.12	7.12	0.86	106.7	ACM #3	298	37.66	32.95	0.97	1.81	95.3
Aircraft	150	38.42	37.14	7.47	1.00	106.8		299	37.67	32.96	1.29	1.81	111.9
Inspection	155	38.47	36.50	6.47	1.07	111.0	Return to base	300	37.68	33.02	1.45	1.81	112.3
	160	38.47	36.19	5.77	1.13	107.0		305	37.68	33.08	0.85	1.82	84.5
	165	38.44	35.95	5.25	1.18	103.8		310	37.68	33.01	0.50	1.83	85.6
Wait to launch	170	38.40	35.74	4.82	1.23	101.5		315	37.67	32.87	0.86	1.84	86.4
	175	38.32	36.12	4.53	1.28	90.9		320	37.65	32.71	0.99	1.85	84.5
	180	38.27	36.41	4.75	1.32	93.5		325	37.64	32.62	0.61	1.85	83.9
	185	38.24	36.53	4.86	1.37	95.5	Secure/Inspect	330	37.64	32.55	0.47	1.86	84.0
	190	38.22	36.48	4.77	1.42	95.8	Aircraft	335	37.65	30.49	0.17	1.87	83.5
	195	38.20	36.35	4.57	1.46	95.0		340	37.69	29.35	0.00	1.87	82.0
Close Canopy	196	38.19	36.24	4.48	1.47	94.8		345	37.73	28.64	0.00	1.87	84.0
	197	38.19	36.02	4.29	1.48	94.1		350	37.74	28.23	0.00	1.87	86.5
	198	38.18	35.79	3.97	1.49	92.3	Debrief	360	37.70	31.01	0.00	1.87	75.6
	199	38.17	35.57	3.77	1.49	90.4		370	37.62	32.05	0.00	1.87	74.4
Initial Flight	200	38.17	35.37	3.63	1.50	89.1		380	37.57	32.46	0.00	1.88	75.0
	205	38.12	35.06	3.39	1.53	92.9		390	37.53	32.68	0.00	1.88	75.8
	210	38.07	34.83	3.07	1.56	91.5		400	37.51	32.87	0.08	1.88	76.6
Flight to area	215	38.02	34.59	2.79	1.59	90.6		410	37.50	33.06	0.18	1.89	77.2
	220	37.97	34.37	2.54	1.61	90.0							
	225	37.93	34.12	2.32	1.63	89.4							

1% Dehydration after 130 minutes

% Dehydrated by the end of the simulation: 2.6%

Winter Ensemble with EAGLE
Warm Environment
Normal Operations w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.2	On Station	230	38.17	34.75	3.63	2.16	91.1
	10	37.11	34.28	0.00	0.00	78.0		240	38.06	34.56	3.17	2.22	91.0
	20	37.28	34.82	0.86	0.01	80.5		250	37.97	34.40	2.77	2.28	90.4
	30	37.41	35.40	0.96	0.03	84.4		260	37.90	34.29	2.43	2.32	90.1
	40	37.49	35.75	1.45	0.06	86.7		270	37.84	34.23	2.16	2.36	90.0
	50	37.57	35.99	1.88	0.09	89.6		280	37.79	34.19	2.05	2.40	90.0
Brief to launch	60	37.64	36.16	2.28	0.13	92.1	ACM #1	290	37.75	34.18	2.06	2.44	89.8
	70	37.71	36.32	2.76	0.18	94.9		291	37.74	34.21	1.79	2.44	114.6
	80	37.78	36.45	3.25	0.24	97.4	Regroup #1	292	37.74	34.23	2.39	2.44	115.1
	90	37.86	36.57	3.76	0.31	99.8		293	37.74	34.35	2.21	2.45	100.6
	100	37.93	36.68	4.30	0.39	102.1	ACM #2	294	37.74	34.41	1.76	2.45	99.5
	110	38.02	36.85	5.06	0.48	104.4		295	37.75	34.40	2.52	2.45	115.5
	120	38.12	36.98	5.84	0.59	105.5	Regroup #2	296	37.75	34.50	2.64	2.46	116.6
	130	38.22	37.08	6.59	0.72	106.2		297	37.76	34.61	2.23	2.46	101.4
	140	38.33	37.12	7.12	0.86	106.7	ACM #3	298	37.76	34.64	2.13	2.47	100.3
Aircraft	150	38.42	37.14	7.47	1.00	106.8		299	37.76	34.65	2.60	2.47	116.4
Inspection	155	38.49	37.32	9.01	1.09	114.4	Return to base	300	37.77	34.72	2.83	2.48	117.3
	160	38.57	37.46	10.16	1.18	115.9		305	37.77	34.73	1.87	2.50	88.5
	165	38.67	37.56	11.17	1.29	115.6		310	37.77	34.66	1.77	2.52	89.3
Wait to launch	170	38.77	37.49	11.79	1.41	115.6		315	37.76	34.58	1.89	2.53	89.8
	175	38.87	37.17	9.87	1.54	108.9		320	37.75	34.51	1.95	2.55	89.5
	180	38.88	36.91	8.51	1.63	106.1		325	37.73	34.47	1.85	2.57	89.0
	185	38.84	36.67	7.54	1.71	102.4	Secure/Inspect	330	37.71	34.46	1.60	2.58	88.7
	190	38.77	36.36	6.68	1.78	96.9	Aircraft	335	37.71	34.57	1.72	2.60	94.2
	195	38.69	36.03	5.96	1.84	92.5		340	37.72	34.71	1.78	2.61	95.1
Close Canopy	196	38.65	36.02	6.14	1.85	93.3		345	37.73	34.81	1.90	2.63	95.6
	197	38.63	36.16	6.05	1.86	94.1		350	37.74	34.86	1.97	2.65	95.8
	198	38.62	36.27	6.06	1.87	94.1	Debrief	360	37.72	34.50	1.01	2.68	81.4
	199	38.60	36.37	6.20	1.89	95.1		370	37.69	34.20	1.75	2.70	83.3
Initial Flight	200	38.59	36.45	6.23	1.90	96.1		380	37.65	34.09	0.25	2.72	81.9
	205	38.51	35.92	5.64	1.96	98.3		390	37.61	33.84	0.75	2.74	80.2
	210	38.45	35.55	5.06	2.01	95.3		400	37.58	33.70	1.09	2.75	82.0
Flight to area	215	38.38	35.29	4.61	2.05	93.7		410	37.55	33.60	0.00	2.76	81.1
	220	38.29	35.07	4.23	2.09	92.5							
	225	38.23	34.90	3.92	2.13	91.7							

1% Dehydration after 130 minutes
3% Dehydration after 230 minutes
% Dehydrated by the end of the simulation: 3.8%

Winter Ensemble with EAGLE
Hot Environment
Normal Operations w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	68.2	On Station	230	38.51	35.58	5.57	2.68	95.6
	10	37.11	34.28	0.00	0.00	78.0		240	38.36	35.39	4.91	2.78	94.7
	20	37.28	34.82	0.86	0.01	80.5		250	38.25	35.26	4.36	2.86	93.9
	30	37.41	35.40	0.96	0.03	84.4		260	38.15	35.19	3.92	2.94	93.4
	40	37.49	35.75	1.45	0.06	86.7		270	38.07	35.16	3.57	3.01	93.1
	50	37.57	35.99	1.88	0.09	89.6		280	38.00	35.17	3.30	3.07	93.1
Brief to launch	60	37.64	36.16	2.28	0.13	92.1	ACM #1	290	37.95	35.22	3.10	3.13	93.3
	70	37.71	36.32	2.76	0.18	94.9		291	37.94	35.21	3.36	3.14	115.8
	80	37.78	36.45	3.25	0.24	97.4	Regroup #1	292	37.94	35.25	3.99	3.14	117.5
	90	37.86	36.57	3.76	0.31	99.8		293	37.94	35.36	3.74	3.15	105.0
	100	37.93	36.68	4.30	0.39	102.1	ACM #2	294	37.94	35.41	3.40	3.16	103.8
	110	38.02	36.85	5.06	0.48	104.4		295	37.95	35.43	3.90	3.16	118.5
	120	38.12	36.98	5.84	0.59	105.5	Regroup #2	296	37.95	35.48	4.33	3.17	119.7
	130	38.22	37.08	6.59	0.72	106.2		297	37.96	35.57	4.06	3.18	107.0
	140	38.33	37.12	7.12	0.86	106.7	ACM #3	298	37.96	35.62	3.74	3.19	105.8
Aircraft	150	38.42	37.14	7.47	1.00	106.8		299	37.97	35.63	4.19	3.19	119.8
Inspection	155	38.51	37.82	11.05	1.07	114.8	Return to base	300	37.98	35.67	4.64	3.20	121.0
	160	38.64	38.12	14.05	1.20	113.9		305	38.00	35.69	3.61	3.24	95.4
	165	38.83	38.35	16.52	1.37	113.7		310	38.00	35.62	3.49	3.27	94.8
Wait to launch	170	39.04	38.50	17.64	1.56	114.1		315	37.99	35.59	3.37	3.31	94.7
	175	39.27	37.56	14.91	1.76	110.8		320	37.97	35.58	3.29	3.34	94.7
	180	39.32	37.16	11.55	1.89	109.7		325	37.96	35.58	3.23	3.37	94.8
	185	39.27	36.87	9.71	2.00	104.8	Secure/Inspect	330	37.94	35.59	3.18	3.40	94.9
	190	39.17	36.49	8.49	2.09	98.1	Aircraft	335	37.96	37.12	5.82	3.44	110.5
	195	39.05	36.10	7.53	2.16	92.9		340	38.06	37.54	8.81	3.52	115.1
Close Canopy	196	38.99	36.25	8.10	2.18	95.1		345	38.23	37.72	11.17	3.62	114.3
	197	38.97	36.75	8.14	2.19	97.9		350	38.43	37.84	13.03	3.75	114.0
	198	38.94	37.14	8.56	2.21	100.3	Debrief	360	38.62	35.69	5.70	3.93	94.2
	199	38.93	37.44	9.24	2.23	103.8		370	38.46	34.40	4.14	4.01	84.8
Initial Flight	200	38.91	37.65	9.82	2.25	106.2		380	38.28	33.53	3.24	4.08	82.3
	205	38.86	36.81	8.65	2.35	108.8		390	38.12	32.91	2.73	4.12	81.4
	210	38.81	36.39	7.69	2.43	104.0		400	37.99	32.48	1.73	4.16	78.9
Flight to area	215	38.75	36.11	7.00	2.50	100.6		410	37.90	32.06	1.53	4.19	77.3
	220	38.65	35.89	6.44	2.56	98.1							
	225	38.58	35.72	5.98	2.62	96.7							

1% Dehydration after 130 minutes
3% Dehydration after 196 minutes
% Dehydrated by the end of the simulation: 5.8%

Summer EAGLE Ensemble
Cool Environment
Normal Operations w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.2	On Station	230	37.62	35.04	1.47	0.69	90.8
	10	37.11	34.35	0.00	0.00	79.0		240	37.62	35.14	1.52	0.72	91.8
	20	37.28	34.79	1.03	0.01	82.6		250	37.61	35.21	1.57	0.75	92.1
	30	37.40	35.27	0.54	0.03	82.8		260	37.61	35.27	1.63	0.78	92.5
	40	37.48	35.43	1.35	0.05	85.2		270	37.62	35.31	1.69	0.81	92.7
	50	37.54	35.58	1.34	0.08	86.3		280	37.62	35.34	1.73	0.84	92.9
Brief to launch	60	37.58	35.65	1.50	0.11	86.9	ACM #1	290	37.63	35.36	1.77	0.88	93.1
	70	37.61	35.71	1.64	0.14	87.6		291	37.63	35.35	2.00	0.88	116.0
	80	37.64	35.75	1.75	0.17	88.0	Regroup #1	292	37.64	35.35	2.60	0.89	117.4
	90	37.66	35.78	1.84	0.21	88.3		293	37.65	35.43	2.45	0.89	104.5
	100	37.68	35.79	1.92	0.24	88.4	ACM #2	294	37.66	35.49	2.09	0.90	103.5
	110	37.69	35.81	1.98	0.28	88.6		295	37.67	35.49	2.54	0.90	118.4
	120	37.70	35.82	2.04	0.32	88.7	Regroup #2	296	37.68	35.51	2.98	0.91	119.3
	130	37.71	35.83	2.09	0.36	88.8		297	37.69	35.59	2.77	0.91	106.2
	140	37.72	35.84	2.14	0.40	88.9	ACM #3	298	37.70	35.63	2.44	0.92	105.1
Aircraft	150	37.73	35.85	2.18	0.44	89.0		299	37.71	35.62	2.84	0.92	119.5
Inspection	155	37.74	35.23	2.01	0.46	97.2	Return to base	300	37.72	35.64	3.29	0.93	120.3
	160	37.76	34.87	1.79	0.48	95.9		305	37.75	35.68	2.41	0.95	94.2
	165	37.76	34.64	1.65	0.50	95.0		310	37.76	35.62	2.36	0.97	93.4
Wait to launch	170	37.76	34.47	1.53	0.51	94.4		315	37.76	35.57	2.30	1.00	93.2
	175	37.74	34.92	1.22	0.53	82.4		320	37.76	35.54	2.25	1.02	93.0
	180	37.72	35.18	1.59	0.54	84.8		325	37.75	35.51	2.22	1.04	93.0
	185	37.70	35.26	1.81	0.56	84.1	Secure/Inspect	330	37.75	35.49	2.19	1.06	92.9
	190	37.69	35.36	1.49	0.57	83.8	Aircraft	335	37.75	35.00	1.92	1.08	95.5
	195	37.68	35.43	1.62	0.59	85.2		340	37.76	34.76	1.78	1.10	95.2
Close Canopy	196	37.68	35.38	1.54	0.59	84.5		345	37.76	34.52	1.66	1.11	94.6
	197	37.68	35.29	1.70	0.59	85.2		350	37.76	34.35	1.56	1.13	94.0
	198	37.68	35.21	1.49	0.60	85.1	Debrief	360	37.72	35.23	1.62	1.16	84.8
	199	37.67	35.12	1.42	0.60	84.1		370	37.69	35.45	1.65	1.19	84.2
Initial Flight	200	37.67	35.03	1.54	0.60	84.4		380	37.68	35.57	1.82	1.22	85.8
	205	37.66	35.03	1.54	0.62	90.7		390	37.68	35.66	1.86	1.26	86.6
	210	37.65	35.05	1.49	0.63	90.7		400	37.68	35.73	1.94	1.30	87.4
Flight to area	215	37.64	35.05	1.49	0.65	90.7		410	37.69	35.79	2.02	1.34	88.0
	220	37.63	35.04	1.49	0.66	90.8							
	225	37.63	35.04	1.48	0.68	90.8							

1% Dehydration after 240 minutes

% Dehydrated by the end of the simulation: 1.9%

Summer EAGLE Ensemble
Warm Environment
Normal Operations w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.1	On Station	230	38.19	36.68	5.69	1.16	107.6
	10	37.11	34.35	0.00	0.00	79.0		240	38.23	36.64	5.73	1.27	107.6
	20	37.28	34.79	1.03	0.01	82.6		250	38.25	36.50	5.52	1.38	106.3
	30	37.40	35.27	0.54	0.03	82.8		260	38.24	36.18	4.98	1.48	102.6
	40	37.48	35.43	1.35	0.05	85.3		270	38.19	35.92	4.43	1.57	99.2
	50	37.54	35.58	1.34	0.08	86.3		280	38.13	35.64	3.95	1.65	96.8
Brief to launch	60	37.58	35.65	1.50	0.11	86.9	ACM #1	290	38.06	35.39	3.49	1.72	95.0
	70	37.61	35.71	1.64	0.14	87.6		291	38.05	35.35	3.81	1.73	116.6
	80	37.64	35.75	1.75	0.17	88.0	Regroup #1	292	38.05	35.37	4.43	1.74	118.4
	90	37.66	35.78	1.84	0.21	88.3		293	38.04	35.46	4.10	1.75	106.1
	100	37.68	35.79	1.92	0.24	88.4	ACM #2	294	38.04	35.50	3.76	1.75	104.8
	110	37.69	35.81	1.98	0.28	88.6		295	38.04	35.49	4.26	1.76	119.1
	120	37.70	35.82	2.04	0.32	88.7	Regroup #2	296	38.05	35.52	4.66	1.77	120.3
	130	37.71	35.83	2.09	0.36	88.8		297	38.05	35.60	4.33	1.78	107.6
	140	37.72	35.84	2.14	0.40	88.9	ACM #3	298	38.05	35.63	3.99	1.79	106.2
Aircraft	150	37.73	35.85	2.18	0.44	89.0		299	38.06	35.61	4.44	1.79	120.0
Inspection	155	37.75	36.10	2.97	0.47	102.3	Return to base	300	38.06	35.62	4.85	1.80	121.1
	160	37.79	36.31	3.52	0.50	105.6		305	38.06	35.50	3.60	1.84	94.4
	165	37.84	36.49	4.09	0.54	108.4		310	38.05	35.27	3.35	1.87	93.0
Wait to launch	170	37.91	36.63	4.74	0.58	110.3		315	38.03	35.10	3.11	1.90	92.2
	175	37.99	36.57	4.30	0.63	100.7		320	38.00	34.96	2.90	1.93	91.6
	180	38.02	36.51	4.19	0.67	99.1		325	37.96	34.82	2.70	1.96	91.1
	185	38.03	36.49	4.16	0.71	98.4	Secure/Inspect	330	37.93	34.71	2.53	1.98	90.7
	190	38.04	36.47	4.14	0.75	97.8	Aircraft	335	37.91	34.69	2.61	2.00	96.0
	195	38.05	36.46	4.14	0.79	97.6		340	37.90	34.77	2.61	2.03	96.3
Close Canopy	196	38.05	36.47	4.46	0.80	99.1		345	37.89	34.70	2.54	2.05	96.4
	197	38.05	36.56	4.56	0.81	100.7		350	37.88	34.58	2.45	2.07	96.1
	198	38.05	36.64	4.64	0.82	101.3	Debrief	360	37.84	34.26	1.57	2.11	81.4
	199	38.05	36.70	4.80	0.83	102.2		370	37.79	33.95	1.79	2.14	83.9
Initial Flight	200	38.05	36.74	4.95	0.84	102.8		380	37.73	33.68	0.51	2.16	81.0
	205	38.08	36.65	5.12	0.89	107.2		390	37.68	33.35	1.20	2.18	80.5
	210	38.10	36.64	5.21	0.94	107.0		400	37.64	33.21	0.89	2.20	81.8
Flight to area	215	38.12	36.65	5.33	0.99	107.2		410	37.61	33.03	0.23	2.21	79.2
	220	38.15	36.67	5.46	1.05	107.3							
	225	38.17	36.68	5.59	1.10	107.5							

1% Dehydration after 185 minutes
3% Dehydration after 390 minutes
% Dehydrated by the end of the simulation: 3.1%

Summer EAGLE Ensemble
Hot Environment
Normal Operations w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.2	On Station	230	38.61	36.30	6.53	1.73	103.7
	10	37.11	34.35	0.00	0.00	79.0		240	38.49	36.04	5.70	1.85	99.9
	20	37.28	34.79	1.03	0.01	82.6		250	38.37	35.80	5.00	1.95	97.2
	30	37.40	35.27	0.54	0.03	82.8		260	38.26	35.69	4.53	2.04	96.1
	40	37.48	35.43	1.35	0.05	85.3		270	38.16	35.60	4.13	2.12	95.3
	50	37.54	35.58	1.34	0.08	86.3		280	38.08	35.51	3.78	2.19	94.8
Brief to launch	60	37.58	35.65	1.50	0.11	86.9	ACM #1	290	38.02	35.43	3.47	2.26	94.2
	70	37.61	35.71	1.64	0.14	87.6		291	38.01	35.41	3.80	2.27	116.3
	80	37.64	35.75	1.75	0.17	88.0	Regroup #1	292	38.01	35.44	4.45	2.28	118.2
	90	37.66	35.78	1.84	0.21	88.3		293	38.01	35.54	4.12	2.29	106.0
	100	37.68	35.79	1.92	0.24	88.4	ACM #2	294	38.01	35.59	3.78	2.29	104.6
	110	37.69	35.81	1.98	0.28	88.6		295	38.01	35.59	4.32	2.30	119.0
	120	37.70	35.82	2.04	0.32	88.7	Regroup #2	296	38.02	35.63	4.74	2.31	120.4
	130	37.71	35.83	2.09	0.36	88.8		297	38.02	35.71	4.42	2.32	107.8
	140	37.72	35.84	2.14	0.40	88.9	ACM #3	298	38.03	35.75	4.08	2.32	106.5
Aircraft	150	37.73	35.85	2.18	0.44	89.0		299	38.03	35.74	4.55	2.33	120.2
Inspection	155	37.76	36.82	4.29	0.48	109.0	Return to base	300	38.04	35.77	4.99	2.34	121.5
	160	37.85	37.25	6.45	0.53	112.9		305	38.05	35.72	3.79	2.38	95.3
	165	38.00	37.50	8.65	0.61	115.1		310	38.04	35.59	3.59	2.42	94.3
Wait to launch	170	38.18	37.71	10.88	0.71	114.2		315	38.03	35.49	3.40	2.45	93.7
	175	38.40	37.26	9.21	0.82	110.1		320	38.00	35.42	3.24	2.48	93.3
	180	38.49	37.14	8.29	0.91	107.8		325	37.98	35.37	3.11	2.51	93.1
	185	38.54	37.08	7.83	0.99	106.6	Secure/Inspect	330	37.95	35.33	2.99	2.54	92.9
	190	38.56	37.03	7.48	1.07	105.8	Aircraft	335	37.96	37.20	5.96	2.58	110.6
	195	38.57	36.93	7.10	1.14	104.8		340	38.06	37.58	8.85	2.66	115.1
Close Canopy	196	38.56	37.14	7.79	1.16	105.7		345	38.23	37.70	11.07	2.76	114.4
	197	38.56	37.39	8.41	1.17	106.9		350	38.42	37.82	12.70	2.89	114.1
	198	38.57	37.54	9.02	1.19	108.2	Debrief	360	38.56	35.32	5.00	3.04	89.5
	199	38.57	37.64	9.57	1.21	109.4		370	38.39	33.98	3.68	3.11	83.2
Initial Flight	200	38.58	37.71	10.07	1.23	110.2		380	38.21	33.08	2.81	3.17	81.3
	205	38.64	37.21	9.33	1.33	112.4		390	38.06	32.56	2.46	3.21	79.5
	210	38.68	37.01	8.75	1.42	111.1		400	37.96	32.24	1.61	3.24	78.0
Flight to area	215	38.69	36.89	8.19	1.51	110.1		410	37.87	31.89	1.38	3.26	76.9
	220	38.68	36.67	7.57	1.59	108.4							
	225	38.65	36.51	7.06	1.66	106.5							

1% Dehydration after 170 minutes
3% Dehydration after 280 minutes
% Dehydrated by the end of the simulation: 4.5%

Summer ATAGS Ensemble
Cool Environment
Normal Operations w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.2	On Station	230	37.73	35.75	2.32	0.84	94.1
	10	37.11	34.27	0.00	0.00	79.0		240	37.73	35.76	2.35	0.89	94.9
	20	37.28	34.76	0.92	0.01	81.5		250	37.73	35.77	2.37	0.93	95.0
	30	37.39	35.29	0.51	0.03	83.8		260	37.73	35.78	2.39	0.98	95.1
	40	37.47	35.50	1.29	0.05	84.6		270	37.73	35.78	2.40	1.02	95.1
	50	37.53	35.69	1.37	0.07	86.4		280	37.73	35.78	2.42	1.07	95.2
Brief to launch	60	37.57	35.80	1.55	0.10	87.3	ACM #1	290	37.73	35.70	2.35	1.12	94.6
	70	37.61	35.90	1.74	0.14	88.3		291	37.74	35.68	2.61	1.12	116.7
	80	37.65	35.97	1.90	0.17	89.0	Regroup #1	292	37.74	35.69	3.22	1.13	118.3
	90	37.67	36.02	2.04	0.21	89.6		293	37.75	35.76	3.07	1.13	105.9
	100	37.70	36.06	2.18	0.25	90.1	ACM #2	294	37.76	35.80	2.74	1.14	105.0
	110	37.72	36.10	2.31	0.30	90.6		295	37.77	35.81	3.15	1.14	119.4
	120	37.74	36.13	2.43	0.34	91.0	Regroup #2	296	37.78	35.83	3.60	1.15	120.3
	130	37.76	36.17	2.55	0.39	91.5		297	37.79	35.90	3.42	1.16	107.9
	140	37.78	36.20	2.67	0.44	91.9	ACM #3	298	37.80	35.94	3.11	1.16	106.8
Aircraft	150	37.80	36.28	2.83	0.49	92.7		299	37.81	35.94	3.48	1.17	120.5
Inspection	155	37.82	35.71	2.64	0.52	99.9	Return to base	300	37.82	35.96	3.93	1.18	121.4
	160	37.84	35.41	2.41	0.54	98.1		305	37.85	35.97	3.03	1.21	96.1
	165	37.84	35.23	2.25	0.57	97.0		310	37.86	35.83	2.87	1.23	95.0
Wait to launch	170	37.83	35.08	2.11	0.59	96.2		315	37.86	35.73	2.75	1.26	94.3
	175	37.81	35.56	1.95	0.60	85.1		320	37.85	35.66	2.66	1.29	93.9
	180	37.79	35.80	2.24	0.62	86.6		325	37.84	35.60	2.57	1.31	93.6
	185	37.78	35.92	2.26	0.65	87.2	Secure/Inspect	330	37.83	35.55	2.50	1.34	93.3
	190	37.77	36.00	2.33	0.67	88.1	Aircraft	335	37.82	34.73	2.08	1.36	95.4
	195	37.77	36.05	2.40	0.69	88.8		340	37.82	34.34	1.82	1.37	94.6
Close Canopy	196	37.77	36.01	2.39	0.70	89.1		345	37.81	34.06	1.66	1.39	93.9
	197	37.76	35.93	2.40	0.70	89.3		350	37.80	33.82	1.52	1.40	93.4
	198	37.76	35.84	2.27	0.70	88.9	Debrief	360	37.74	35.04	1.39	1.43	83.9
	199	37.76	35.76	2.20	0.71	88.1		370	37.71	35.25	1.77	1.46	82.3
Initial Flight	200	37.76	35.69	2.18	0.71	87.7		380	37.68	35.44	1.78	1.50	85.6
	205	37.75	35.71	2.30	0.73	94.0		390	37.67	35.56	1.71	1.53	85.2
	210	37.74	35.73	2.29	0.76	93.9		400	37.67	35.56	1.78	1.56	85.9
Flight to area	215	37.74	35.74	2.30	0.78	94.0		410	37.67	35.56	1.77	1.60	86.1
	220	37.73	35.74	2.30	0.80	94.0							
	225	37.73	35.74	2.31	0.82	94.1							

1% Dehydration after 205 minutes

% Dehydrated by the end of the simulation: 2.2%

Summer ATAGS Ensemble
Warm Environment
Normal Operations w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.09	On Station	230	38.44	36.76	6.58	1.46	108.0
	10	37.11	34.27	0.00	0.00	78.98		240	38.42	36.57	6.06	1.58	105.9
	20	37.28	34.76	0.92	0.01	81.47		250	38.36	36.30	5.42	1.69	102.2
	30	37.39	35.29	0.51	0.03	83.84		260	38.29	36.04	4.87	1.79	99.5
	40	37.47	35.50	1.29	0.05	84.58		270	38.20	35.58	4.13	1.88	95.9
	50	37.53	35.69	1.37	0.07	86.44		280	38.11	35.28	3.58	1.95	93.8
Brief to launch	60	37.57	35.80	1.55	0.10	87.27	ACM #1	290	38.02	34.89	3.08	2.01	92.3
	70	37.61	35.90	1.74	0.14	88.30		291	38.01	34.85	3.34	2.02	115.1
	80	37.65	35.97	1.90	0.17	89.00	Regroup #1	292	38.01	34.87	3.92	2.02	116.7
	90	37.67	36.02	2.04	0.21	89.58		293	38.00	34.97	3.47	2.03	103.3
	100	37.70	36.06	2.18	0.25	90.09	ACM #2	294	38.00	35.00	3.18	2.04	101.8
	110	37.72	36.10	2.31	0.30	90.57		295	37.99	34.98	3.78	2.04	117.1
	120	37.74	36.13	2.43	0.34	91.03	Regroup #2	296	37.99	35.03	4.04	2.05	118.3
	130	37.76	36.17	2.55	0.39	91.48		297	38.00	35.12	3.62	2.06	104.4
	140	37.78	36.20	2.67	0.44	91.92	ACM #3	298	37.99	35.14	3.35	2.06	102.9
Aircraft	150	37.80	36.28	2.83	0.49	92.66		299	38.00	35.12	3.87	2.07	117.8
Inspection	155	37.83	36.55	3.90	0.53	106.81	Return to base	300	38.00	35.16	4.18	2.08	118.9
	160	37.89	36.77	4.77	0.57	110.38		305	37.99	35.05	2.95	2.11	91.0
	165	37.97	36.90	5.59	0.62	111.74		310	37.98	34.85	2.81	2.14	90.8
Wait to launch	170	38.06	37.01	6.39	0.68	112.49		315	37.95	34.69	2.66	2.16	90.3
	175	38.17	36.96	5.95	0.75	105.22		320	37.92	34.55	2.48	2.18	89.9
	180	38.22	36.94	5.84	0.81	104.67		325	37.89	34.45	2.31	2.20	89.6
	185	38.25	36.93	5.85	0.86	104.33	Secure/Inspect	330	37.86	34.35	2.14	2.22	89.3
	190	38.27	36.92	5.85	0.92	104.17	Aircraft	335	37.84	34.23	2.16	2.24	94.7
	195	38.29	36.89	5.78	0.98	103.62		340	37.84	34.25	2.15	2.26	94.8
Close Canopy	196	38.29	36.92	6.09	0.99	104.53		345	37.83	34.26	2.10	2.28	94.7
	197	38.30	37.01	6.26	1.00	105.15		350	37.82	34.11	1.99	2.30	94.6
	198	38.30	37.08	6.43	1.02	105.63	Debrief	360	37.78	33.78	0.86	2.33	80.7
	199	38.30	37.12	6.63	1.03	105.95		370	37.73	33.34	1.49	2.35	80.8
Initial Flight	200	38.31	37.16	6.80	1.04	106.25		380	37.68	33.12	0.90	2.37	81.6
	205	38.34	37.00	6.93	1.11	109.75		390	37.64	32.84	0.35	2.38	78.7
	210	38.37	36.99	6.97	1.18	109.53		400	37.62	32.59	0.64	2.39	77.6
Flight to area	215	38.40	36.98	7.05	1.25	109.56		410	37.61	32.41	0.60	2.40	77.5
	220	38.43	36.91	6.93	1.32	109.24							
	225	38.44	36.82	6.75	1.39	108.64							

1% Dehydration after 170 minutes
3% Dehydration after 320 minutes
% Dehydrated by the end of the simulation: 3.3%

Summer ATAGS Ensemble
Hot Environment
Normal Operations w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	68.2	On Station	230	38.79	36.71	7.81	2.01	107.3
	10	37.11	34.27	0.00	0.00	79.0		240	38.68	36.50	7.02	2.16	104.6
	20	37.28	34.76	0.92	0.01	81.5		250	38.57	36.34	6.41	2.29	102.4
	30	37.39	35.29	0.51	0.03	83.9		260	38.47	36.18	5.82	2.41	100.5
	40	37.47	35.50	1.29	0.05	84.6		270	38.38	36.09	5.37	2.52	99.5
	50	37.53	35.69	1.37	0.07	86.4		280	38.30	36.03	5.02	2.62	98.9
Brief to launch	60	37.57	35.80	1.55	0.10	87.3	ACM #1	290	38.23	35.97	4.70	2.71	98.5
	70	37.61	35.90	1.74	0.14	88.3		291	38.22	35.95	5.14	2.72	119.0
	80	37.65	35.97	1.90	0.17	89.0	Regroup #1	292	38.22	35.98	5.85	2.73	121.2
	90	37.67	36.02	2.04	0.21	89.6		293	38.22	36.07	5.59	2.74	110.3
	100	37.70	36.06	2.18	0.25	90.1	ACM #2	294	38.22	36.11	5.26	2.75	109.3
	110	37.72	36.10	2.31	0.30	90.6		295	38.23	36.12	5.76	2.76	122.4
	120	37.74	36.13	2.43	0.34	91.0	Regroup #2	296	38.23	36.15	6.26	2.78	123.2
	130	37.76	36.17	2.55	0.39	91.5		297	38.24	36.22	6.02	2.79	112.2
	140	37.78	36.20	2.67	0.44	91.9	ACM #3	298	38.25	36.26	5.67	2.80	111.6
Aircraft	150	37.80	36.28	2.83	0.49	92.7		299	38.26	36.25	6.11	2.81	123.9
Inspection	155	37.85	37.11	5.37	0.53	111.1	Return to base	300	38.27	36.27	6.61	2.82	124.2
	160	37.96	37.45	7.86	0.60	114.8		305	38.29	36.21	5.31	2.88	101.0
	165	38.12	37.69	10.28	0.69	114.3		310	38.28	36.12	5.04	2.93	99.6
Wait to launch	170	38.32	37.93	12.61	0.81	113.8		315	38.27	36.05	4.83	2.98	98.8
	175	38.57	37.48	11.06	0.95	109.9		320	38.25	36.00	4.65	3.02	98.3
	180	38.67	37.38	9.90	1.06	109.9		325	38.22	35.96	4.50	3.07	97.9
	185	38.73	37.29	9.26	1.16	108.2	Secure/Inspect	330	38.19	35.93	4.37	3.11	97.7
	190	38.75	37.16	8.59	1.25	106.9	Aircraft	335	38.21	37.61	8.55	3.17	113.9
	195	38.74	37.01	7.89	1.33	105.4		340	38.34	37.88	12.05	3.28	114.1
Close Canopy	196	38.74	37.28	8.57	1.35	106.2		345	38.54	38.04	14.39	3.42	113.7
	197	38.73	37.59	9.31	1.36	107.4		350	38.76	38.06	15.90	3.59	114.0
	198	38.74	37.77	10.09	1.38	109.0	Debrief	360	38.92	35.97	7.14	3.80	96.3
	199	38.74	37.88	10.81	1.41	110.1		370	38.71	34.65	5.28	3.91	85.5
Initial Flight	200	38.75	37.96	11.47	1.43	110.3		380	38.49	33.70	4.17	3.99	82.8
	205	38.81	37.37	10.59	1.55	113.8		390	38.30	33.02	2.83	4.05	81.2
	210	38.85	37.25	10.03	1.65	112.5		400	38.14	32.48	2.79	4.10	78.5
Flight to area	215	38.86	37.14	9.52	1.75	111.5		410	38.03	32.19	2.38	4.13	78.1
	220	38.86	36.99	8.89	1.85	110.4							
	225	38.83	36.84	8.34	1.93	109.0							

1% Dehydration after 165 minutes
3% Dehydration after 240 minutes
% Dehydrated by the end of the simulation: 5.7%

Summer ATAGS with additional arm coverage Ensemble
Cool Environment
Normal Operations w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.1	On Station	230	37.80	35.32	2.33	1.14	92.2
	10	37.11	34.28	0.00	0.00	79.0		240	37.77	35.23	2.18	1.19	92.4
	20	37.28	34.82	0.98	0.01	81.7		250	37.74	35.14	2.03	1.22	92.0
	30	37.40	35.43	0.64	0.03	84.3		260	37.71	34.99	1.86	1.26	91.5
	40	37.48	35.72	1.34	0.05	85.8		270	37.69	34.87	1.71	1.29	91.0
	50	37.54	35.93	1.63	0.08	88.1		280	37.67	34.63	1.53	1.32	90.4
Brief to launch	60	37.60	36.06	1.90	0.12	89.6	ACM #1	290	37.65	34.45	1.36	1.35	89.9
	70	37.65	36.16	2.18	0.16	91.1		291	37.65	34.42	1.43	1.35	114.4
	80	37.70	36.24	2.43	0.20	92.3	Regroup #1	292	37.65	34.42	1.94	1.36	115.1
	90	37.74	36.30	2.68	0.25	93.4		293	37.65	34.52	1.71	1.36	100.5
	100	37.78	36.36	2.91	0.31	94.3	ACM #2	294	37.65	34.56	1.37	1.36	99.6
	110	37.82	36.42	3.15	0.37	95.2		295	37.66	34.55	1.92	1.36	115.7
	120	37.86	36.51	3.42	0.43	96.3	Regroup #2	296	37.66	34.61	2.14	1.37	116.5
	130	37.90	36.61	3.83	0.50	98.6		297	37.67	34.70	1.81	1.37	101.3
	140	37.95	36.69	4.22	0.58	100.4	ACM #3	298	37.67	34.73	1.62	1.37	100.2
Aircraft	150	38.01	36.73	4.52	0.67	101.4		299	37.68	34.73	2.05	1.38	116.3
Inspection	155	38.04	36.11	4.02	0.71	104.8	Return to base	300	37.68	34.77	2.30	1.38	117.0
	160	38.05	35.82	3.63	0.75	101.6		305	37.69	34.76	1.39	1.40	88.1
	165	38.05	35.62	3.34	0.78	99.7		310	37.69	34.60	1.36	1.41	88.8
Wait to launch	170	38.03	35.45	3.11	0.81	98.4		315	37.68	34.37	1.43	1.42	88.6
	175	37.99	36.00	3.08	0.84	88.5		320	37.67	34.17	1.42	1.44	88.1
	180	37.96	36.21	3.27	0.87	90.3		325	37.66	33.95	1.25	1.45	87.3
	185	37.95	36.29	3.33	0.90	91.4	Secure/Inspect	330	37.64	33.77	0.71	1.46	87.0
	190	37.94	36.31	3.34	0.93	92.1	Aircraft	335	37.65	31.43	0.20	1.46	86.0
	195	37.93	36.31	3.36	0.96	92.4		340	37.67	30.38	0.00	1.46	83.0
Close Canopy	196	37.93	36.21	3.32	0.97	92.5		345	37.69	29.82	0.00	1.46	81.8
	197	37.93	36.06	3.20	0.98	92.1		350	37.69	29.58	0.00	1.47	82.2
	198	37.93	35.93	2.99	0.98	90.9	Debrief	360	37.63	32.31	0.00	1.47	74.2
	199	37.93	35.81	2.89	0.99	89.7		370	37.55	33.05	0.00	1.47	75.2
Initial Flight	200	37.92	35.72	2.83	0.99	89.0		380	37.50	33.38	0.00	1.47	76.4
	205	37.90	35.68	2.87	1.02	94.4		390	37.47	33.66	0.15	1.48	77.7
	210	37.88	35.63	2.74	1.05	93.8		400	37.46	33.90	0.29	1.48	78.9
Flight to area	215	37.86	35.56	2.64	1.07	93.4		410	37.46	34.10	0.43	1.49	79.4
	220	37.83	35.50	2.54	1.10	93.0							
	225	37.82	35.43	2.44	1.12	92.7							

1% Dehydration after 155 minutes

% Dehydrated by the end of the simulation: 2.1%

Summer ATAGS with additional arm coverage Ensemble
Warm Environment
Normal Operations w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.2	On Station	230	38.39	36.21	5.42	1.78	101.0
	10	37.11	34.28	0.00	0.00	79.0		240	38.29	35.90	4.73	1.87	97.9
	20	37.28	34.82	0.98	0.01	81.7		250	38.20	35.55	4.13	1.95	95.5
	30	37.40	35.43	0.64	0.03	84.3		260	38.11	35.27	3.64	2.03	94.0
	40	37.48	35.72	1.34	0.05	85.8		270	38.02	35.07	3.23	2.09	92.9
	50	37.54	35.93	1.63	0.08	88.1		280	37.95	34.87	2.86	2.14	92.0
Brief to launch	60	37.60	36.06	1.90	0.12	89.6	ACM #1	290	37.89	34.69	2.53	2.19	91.3
	70	37.65	36.16	2.18	0.16	91.1		291	37.88	34.66	2.75	2.20	114.6
	80	37.70	36.24	2.43	0.20	92.3	Regroup #1	292	37.88	34.69	3.32	2.20	116.0
	90	37.74	36.30	2.68	0.25	93.4		293	37.88	34.81	2.89	2.21	102.3
	100	37.78	36.36	2.91	0.31	94.3	ACM #2	294	37.88	34.85	2.61	2.21	100.8
	110	37.82	36.42	3.15	0.37	95.2		295	37.88	34.84	3.24	2.22	116.5
	120	37.86	36.51	3.42	0.43	96.3	Regroup #2	296	37.88	34.91	3.46	2.23	117.7
	130	37.90	36.61	3.83	0.50	98.6		297	37.88	35.00	3.06	2.23	103.3
	140	37.95	36.69	4.22	0.58	100.4	ACM #3	298	37.88	35.03	2.82	2.24	102.0
Aircraft	150	38.01	36.73	4.52	0.67	101.4		299	37.89	35.02	3.35	2.24	117.3
Inspection	155	38.06	36.96	5.89	0.72	111.6	Return to base	300	37.89	35.07	3.65	2.25	118.3
	160	38.14	37.11	6.91	0.78	112.8		305	37.89	34.92	2.46	2.27	90.0
	165	38.23	37.22	7.86	0.86	113.9		310	37.88	34.70	2.34	2.30	90.1
Wait to launch	170	38.34	37.27	8.61	0.94	114.7		315	37.86	34.52	2.26	2.32	89.7
	175	38.45	37.16	7.84	1.03	107.2		320	37.84	34.37	2.15	2.34	89.3
	180	38.50	37.10	7.49	1.11	106.2		325	37.82	34.24	2.01	2.35	88.9
	185	38.52	37.06	7.22	1.18	105.6	Secure/Inspect	330	37.79	34.13	1.83	2.37	88.5
	190	38.53	36.97	6.91	1.26	104.8	Aircraft	335	37.78	33.81	1.80	2.39	93.5
	195	38.52	36.82	6.46	1.32	103.0		340	37.77	33.78	1.65	2.40	93.6
Close Canopy	196	38.51	36.92	6.76	1.34	103.8		345	37.77	33.76	1.50	2.42	93.6
	197	38.51	37.07	7.04	1.35	104.8		350	37.77	33.75	1.39	2.43	93.8
	198	38.50	37.15	7.28	1.36	105.5	Debrief	360	37.73	33.55	1.30	2.46	82.6
	199	38.50	37.21	7.51	1.38	106.1		370	37.68	33.22	0.21	2.47	80.6
Initial Flight	200	38.50	37.25	7.70	1.39	106.5		380	37.64	32.85	0.60	2.48	78.1
	205	38.51	36.86	7.08	1.47	109.0		390	37.62	32.57	0.84	2.50	77.8
	210	38.50	36.75	6.71	1.54	107.5		400	37.61	32.37	0.44	2.51	77.5
Flight to area	215	38.49	36.61	6.37	1.60	106.1		410	37.59	32.15	0.27	2.52	76.7
	220	38.45	36.50	6.08	1.66	104.4							
	225	38.42	36.39	5.79	1.72	103.0							

1% Dehydration after 155 minutes
3% Dehydration after 290 minutes
% Dehydrated by the end of the simulation: 3.5%

Summer ATAGS with additional arm coverage Ensemble
Hot Environment
Normal Operations w/ACM

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	68.2	On Station	230	38.96	37.18	9.82	2.46	111.0
	10	37.11	34.28	0.00	0.00	79.0		240	38.92	37.14	9.55	2.66	111.0
	20	37.28	34.82	0.98	0.01	81.7		250	38.87	37.08	9.26	2.85	110.7
	30	37.40	35.43	0.64	0.03	84.3		260	38.83	37.02	8.95	3.03	110.4
	40	37.48	35.72	1.34	0.05	85.8		270	38.79	36.97	8.66	3.21	110.1
	50	37.54	35.93	1.63	0.08	88.1		280	38.75	36.92	8.40	3.38	109.8
Brief to launch	60	37.60	36.06	1.90	0.12	89.6	ACM #1	290	38.71	36.87	8.14	3.55	109.5
	70	37.65	36.16	2.18	0.16	91.1		291	38.71	36.86	8.64	3.57	125.8
	80	37.70	36.24	2.43	0.20	92.3	Regroup #1	292	38.71	36.87	9.44	3.59	125.5
	90	37.74	36.30	2.68	0.25	93.4		293	38.71	36.90	9.46	3.61	115.4
	100	37.78	36.36	2.91	0.31	94.3	ACM #2	294	38.72	36.93	9.17	3.62	115.9
	110	37.82	36.42	3.15	0.37	95.2		295	38.73	36.94	9.54	3.64	126.9
	120	37.86	36.51	3.42	0.43	96.3	Regroup #2	296	38.73	36.95	10.11	3.66	126.5
	130	37.90	36.61	3.83	0.50	98.6		297	38.75	36.98	10.07	3.68	116.4
	140	37.95	36.69	4.22	0.58	100.4	ACM #3	298	38.75	37.00	9.76	3.70	116.8
Aircraft	150	38.01	36.73	4.52	0.67	101.4		299	38.77	37.00	10.10	3.72	127.5
Inspection	155	38.07	37.44	7.63	0.73	113.7	Return to base	300	38.78	37.01	10.65	3.74	127.1
	160	38.21	37.74	10.37	0.82	114.5		305	38.82	37.01	9.30	3.84	110.0
	165	38.39	38.00	12.91	0.94	113.8		310	38.82	36.97	8.95	3.94	109.6
Wait to launch	170	38.60	38.24	15.28	1.09	113.5		315	38.81	36.93	8.69	4.03	109.4
	175	38.85	37.61	12.98	1.26	109.9		320	38.80	36.89	8.48	4.11	109.1
	180	38.94	37.38	11.07	1.39	110.5		325	38.77	36.86	8.29	4.20	108.9
	185	38.97	37.26	9.90	1.49	108.0	Secure/Inspect	330	38.75	36.84	8.12	4.28	108.7
	190	38.95	37.07	8.89	1.59	106.0	Aircraft	335	38.77	38.19	13.32	4.39	114.6
	195	38.90	36.86	8.04	1.67	103.0		340	38.91	38.47	16.87	4.56	113.9
Close Canopy	196	38.88	37.29	8.82	1.69	104.6		345	39.11	38.69	17.64	4.75	114.0
	197	38.87	37.77	9.83	1.71	106.6		350	39.34	38.87	17.64	4.95	114.4
	198	38.86	38.07	10.98	1.73	109.0	Debrief	360	39.56	37.00	11.96	5.28	109.0
	199	38.87	38.26	12.05	1.75	110.2		370	39.33	36.12	8.92	5.48	95.2
Initial Flight	200	38.87	38.39	13.07	1.78	110.0		380	39.03	35.37	7.22	5.63	88.6
	205	38.94	37.47	11.75	1.92	114.4		390	38.76	34.72	5.94	5.74	85.3
	210	38.98	37.36	11.01	2.03	113.3		400	38.54	34.17	4.91	5.84	83.6
Flight to area	215	38.99	37.31	10.64	2.14	112.4		410	38.36	33.70	3.99	5.91	82.8
	220	38.99	37.26	10.37	2.25	112.0							
	225	38.98	37.21	10.05	2.36	111.4							

1% Dehydration after 155 minutes
3% Dehydration after 215 minutes
6% Dehydration after 330 minutes
Threshold for critical loss of CNS function (SWT = 4.5 kg): 340 minutes
% Dehydrated by the end of the simulation: 8.1%

Winter Control Ensemble
Cool Environment
Normal Operations

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.3	Initial Flight	200	37.89	35.95	3.00	0.88	91.7
	10	37.11	34.27	0.00	0.00	77.9		205	37.88	35.85	3.04	0.91	96.6
	20	37.28	34.77	0.81	0.01	80.3		210	37.87	35.83	2.98	0.94	96.2
	30	37.41	35.29	0.84	0.03	84.1	Flight to area	215	37.86	35.79	2.93	0.97	95.8
	40	37.49	35.57	1.25	0.05	85.2		220	37.85	35.75	2.87	0.99	95.5
	50	37.55	35.75	1.56	0.08	87.2		225	37.84	35.71	2.81	1.02	95.1
Brief to launch	60	37.60	35.86	1.77	0.11	88.6	On Station	230	37.83	35.68	2.75	1.05	94.8
	70	37.64	35.95	1.99	0.15	89.8		240	37.81	35.61	2.66	1.10	95.0
	80	37.68	36.03	2.18	0.19	90.6		250	37.80	35.55	2.55	1.15	94.6
	90	37.71	36.08	2.36	0.24	91.4		260	37.78	35.48	2.44	1.19	94.1
	100	37.74	36.13	2.53	0.28	92.0		270	37.76	35.42	2.34	1.24	93.7
	110	37.77	36.18	2.70	0.34	92.6		280	37.75	35.36	2.26	1.28	93.5
	120	37.80	36.23	2.87	0.39	93.3		290	37.73	35.30	2.16	1.33	93.1
	130	37.82	36.32	3.07	0.45	94.2	Return to base	300	37.72	35.26	2.06	1.37	92.7
	140	37.85	36.42	3.38	0.51	95.9		305	37.71	35.22	2.00	1.38	91.8
Aircraft	150	37.89	36.49	3.68	0.58	97.5		310	37.71	35.19	1.96	1.40	91.7
Inspection	155	37.93	35.97	3.49	0.62	103.6		315	37.70	35.16	1.91	1.42	91.5
	160	37.94	35.73	3.25	0.65	101.4		320	37.69	35.13	1.86	1.44	91.4
	165	37.95	35.59	3.07	0.68	100.1		325	37.69	35.10	1.82	1.46	91.2
Wait to launch	170	37.95	35.47	2.93	0.70	99.1	Secure/Inspect	330	37.68	35.07	1.78	1.47	91.1
	175	37.93	35.81	2.79	0.73	88.5	Aircraft	335	37.69	34.41	1.55	1.49	93.7
	180	37.91	36.05	2.96	0.76	89.7		340	37.70	34.08	1.26	1.50	93.4
	185	37.89	36.17	3.06	0.79	91.1		345	37.71	33.86	1.11	1.51	93.2
	190	37.89	36.25	3.17	0.82	92.2		350	37.71	33.67	1.05	1.52	93.0
	195	37.89	36.28	3.25	0.85	93.0	Debrief	360	37.67	34.55	1.60	1.54	83.0
Close Canopy	196	37.89	36.23	3.26	0.86	93.3		370	37.63	34.92	0.71	1.57	81.8
	197	37.89	36.17	3.27	0.86	93.6		380	37.61	35.03	1.71	1.59	83.4
	198	37.89	36.09	3.14	0.87	93.1		390	37.60	35.23	0.95	1.62	83.9
	199	37.89	36.01	3.05	0.87	92.3		400	37.60	35.28	1.55	1.64	84.0
								410	37.61	35.40	1.38	1.67	85.2

1% Dehydration after 175 minutes

% Dehydrated by the end of the simulation: 2.3%

Winter Control Ensemble
Warm Environment
Normal Operations

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.1	Initial Flight	200	38.43	37.11	7.18	1.23	106.1
	10	37.11	34.27	0.00	0.00	77.9		205	38.45	36.99	7.29	1.30	109.7
	20	37.28	34.77	0.81	0.01	80.3		210	38.46	36.92	7.13	1.37	109.3
	30	37.41	35.29	0.84	0.03	84.1	Flight to area	215	38.47	36.78	6.83	1.44	108.4
	40	37.49	35.57	1.25	0.05	85.2		220	38.46	36.63	6.46	1.51	107.0
	50	37.55	35.75	1.56	0.08	87.2		225	38.44	36.31	5.81	1.57	103.5
Brief to launch	60	37.60	35.86	1.77	0.11	88.6	On Station	230	38.41	36.00	5.21	1.62	99.7
	70	37.64	35.95	1.99	0.15	89.8		240	38.29	35.46	4.32	1.71	95.5
	80	37.68	36.03	2.18	0.19	90.6		250	38.17	35.02	3.65	1.79	93.0
	90	37.71	36.08	2.36	0.24	91.4		260	38.06	34.68	3.14	1.85	91.7
	100	37.74	36.13	2.53	0.28	92.0		270	37.98	34.45	2.73	1.90	90.9
	110	37.77	36.18	2.70	0.34	92.6		280	37.90	34.31	2.42	1.95	90.5
	120	37.80	36.23	2.87	0.39	93.3		290	37.84	34.24	2.17	1.99	90.2
	130	37.82	36.32	3.07	0.45	94.2	Return to base	300	37.79	34.23	1.98	2.03	90.1
	140	37.85	36.42	3.38	0.51	95.9		305	37.77	34.24	1.89	2.05	89.3
Aircraft	150	37.89	36.49	3.68	0.58	97.5		310	37.75	34.26	1.83	2.06	89.4
Inspection	155	37.94	36.72	4.89	0.62	110.1		315	37.74	34.30	1.78	2.08	89.4
	160	38.00	36.90	5.81	0.67	111.6		320	37.72	34.34	1.74	2.10	89.5
	165	38.09	37.03	6.68	0.74	112.6		325	37.71	34.39	1.72	2.11	89.6
Wait to launch	170	38.19	37.13	7.52	0.81	113.5	Secure/Inspect	330	37.70	34.44	1.69	2.13	89.7
	175	38.31	37.07	7.08	0.89	106.4	Aircraft	335	37.70	34.77	1.97	2.15	95.0
	180	38.37	37.01	6.81	0.96	105.7		340	37.72	35.07	2.13	2.17	96.2
	185	38.40	36.99	6.68	1.03	105.3		345	37.74	35.27	2.29	2.19	97.3
	190	38.42	36.97	6.59	1.09	104.9		350	37.76	35.40	2.44	2.21	98.2
	195	38.43	36.92	6.45	1.16	104.5	Debrief	360	37.76	34.97	1.76	2.25	84.4
Close Canopy	196	38.43	36.91	6.72	1.17	105.1		370	37.74	34.64	1.63	2.28	83.5
	197	38.43	36.96	6.81	1.18	105.5		380	37.71	34.43	1.31	2.31	81.8
	198	38.43	37.02	6.89	1.20	105.7		390	37.68	34.40	0.85	2.33	83.7
	199	38.43	37.07	7.03	1.21	105.9		400	37.64	34.28	1.13	2.35	80.9
								410	37.62	34.39	0.81	2.37	83.5

1% Dehydration after 165 minutes
3% Dehydration after 340 minutes
% Dehydrated by the end of the simulation: 3.3%

Winter Control Ensemble
Hot Environment
Normal Operations

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.1	Initial Flight	200	38.79	37.54	9.77	1.60	108.1
	10	37.11	34.27	0.00	0.00	77.9		205	38.79	36.82	8.47	1.70	110.2
	20	37.28	34.77	0.81	0.01	80.3		210	38.76	36.48	7.42	1.77	106.0
	30	37.41	35.29	0.84	0.03	84.1	Flight to area	215	38.70	36.08	6.61	1.84	101.4
	40	37.49	35.57	1.25	0.05	85.2		220	38.61	35.68	5.89	1.90	97.6
	50	37.55	35.75	1.56	0.08	87.2		225	38.53	35.27	5.25	1.96	94.6
Brief to launch	60	37.60	35.86	1.77	0.11	88.6	On Station	230	38.45	34.91	4.72	2.00	92.6
	70	37.64	35.95	1.99	0.15	89.8		240	38.27	34.37	3.92	2.08	91.1
	80	37.68	36.03	2.18	0.19	90.6		250	38.14	34.03	3.36	2.15	90.2
	90	37.71	36.08	2.36	0.24	91.4		260	38.03	33.85	3.13	2.20	90.0
	100	37.74	36.13	2.53	0.28	92.0		270	37.94	33.78	2.77	2.25	88.6
	110	37.77	36.18	2.70	0.34	92.6		280	37.86	33.97	1.57	2.29	89.6
	120	37.80	36.23	2.87	0.39	93.3		290	37.80	34.13	2.12	2.33	91.0
	130	37.82	36.32	3.07	0.45	94.2	Return to base	300	37.76	34.27	2.43	2.36	89.8
	140	37.85	36.42	3.38	0.51	95.9		305	37.73	34.38	2.10	2.38	88.5
Aircraft	150	37.89	36.49	3.68	0.58	97.5		310	37.72	34.53	1.63	2.40	88.8
Inspection	155	37.95	37.24	6.42	0.64	112.3		315	37.71	34.68	1.45	2.42	90.0
	160	38.07	37.56	8.90	0.72	115.1		320	37.70	34.79	1.71	2.44	91.3
	165	38.24	37.79	11.30	0.82	114.2		325	37.70	34.86	2.09	2.46	91.7
Wait to launch	170	38.44	38.02	13.53	0.95	113.7	Secure/Inspect	330	37.69	34.94	2.12	2.47	91.2
	175	38.69	37.63	12.29	1.11	109.6	Aircraft	335	37.71	36.40	3.37	2.50	102.2
	180	38.79	37.45	10.81	1.23	110.7		340	37.78	36.95	5.12	2.54	110.9
	185	38.84	37.32	9.91	1.33	108.7		345	37.89	37.13	6.71	2.60	113.1
	190	38.86	37.12	8.92	1.43	106.9		350	38.04	37.20	7.89	2.67	114.5
	195	38.83	36.81	7.82	1.51	103.8	Debrief	360	38.16	34.82	3.04	2.77	86.0
Close Canopy	196	38.81	36.85	8.29	1.53	104.4		370	38.05	33.49	2.13	2.81	82.1
	197	38.81	37.09	8.48	1.55	105.6		380	37.93	32.64	2.13	2.85	78.9
	198	38.80	37.30	8.84	1.56	106.4		390	37.85	32.18	1.28	2.87	78.0
	199	38.80	37.44	9.33	1.58	107.2		400	37.79	31.87	0.76	2.89	77.0
								410	37.73	31.71	0.79	2.90	76.3

1% Dehydration after 160 minutes
3% Dehydration after 260 minutes
% Dehydrated by the end of the simulation: 4.0%

Winter Ensemble with EAGLE
Cool Environment
Normal Operations

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.2	Initial Flight	200	38.17	35.37	3.63	1.50	89.1
	10	37.11	34.28	0.00	0.00	78.0		205	38.12	35.06	3.39	1.53	92.9
	20	37.28	34.82	0.86	0.01	80.5		210	38.07	34.83	3.07	1.56	91.5
	30	37.41	35.40	0.96	0.03	84.4	Flight to area	215	38.02	34.59	2.79	1.59	90.6
	40	37.49	35.75	1.45	0.06	86.7		220	37.97	34.37	2.54	1.61	90.0
	50	37.57	35.99	1.88	0.09	89.6		225	37.93	34.12	2.32	1.63	89.4
Brief to launch	60	37.64	36.16	2.28	0.13	92.1	On Station	230	37.89	33.90	2.12	1.65	89.0
	70	37.71	36.32	2.76	0.18	94.9		240	37.82	33.55	1.80	1.69	89.1
	80	37.78	36.45	3.25	0.24	97.4		250	37.77	33.29	1.66	1.72	88.8
	90	37.86	36.57	3.76	0.31	99.8		260	37.72	33.11	1.36	1.74	87.9
	100	37.93	36.68	4.30	0.39	102.1		270	37.68	33.04	0.78	1.76	88.8
	110	38.02	36.85	5.06	0.48	104.4		280	37.65	32.81	1.18	1.78	87.8
	120	38.12	36.98	5.84	0.59	105.5		290	37.63	32.67	0.60	1.80	85.7
	130	38.22	37.08	6.59	0.72	106.2	Return to base	300	37.63	32.50	0.92	1.81	84.7
	140	38.33	37.12	7.12	0.86	106.7		305	37.62	32.42	0.77	1.82	83.5
Aircraft	150	38.42	37.14	7.47	1.00	106.8		310	37.62	32.37	0.52	1.82	83.5
Inspection	155	38.47	36.50	6.47	1.07	111.0		315	37.62	32.32	0.56	1.83	83.4
	160	38.47	36.19	5.77	1.13	107.0		320	37.62	32.26	0.65	1.83	83.0
	165	38.44	35.95	5.25	1.18	103.8		325	37.62	32.22	0.52	1.84	82.9
Wait to launch	170	38.40	35.74	4.82	1.23	101.5	Secure/Inspect	330	37.61	32.17	0.46	1.85	82.8
	175	38.32	36.12	4.53	1.28	90.9	Aircraft	335	37.63	30.25	0.10	1.85	82.6
	180	38.27	36.41	4.75	1.32	93.5		340	37.67	29.18	0.00	1.85	82.2
	185	38.24	36.53	4.86	1.37	95.5		345	37.70	28.56	0.00	1.85	84.4
	190	38.22	36.48	4.77	1.42	95.8		350	37.71	28.22	0.00	1.85	86.6
	195	38.20	36.35	4.57	1.46	95.0	Debrief	360	37.65	30.99	0.00	1.85	75.5
Close Canopy	196	38.19	36.24	4.48	1.47	94.8		370	37.58	32.04	0.00	1.85	74.3
	197	38.19	36.02	4.29	1.48	94.1		380	37.52	32.45	0.00	1.86	74.9
	198	38.18	35.79	3.97	1.49	92.3		390	37.48	32.67	0.00	1.86	75.6
	199	38.17	35.57	3.77	1.49	90.4		400	37.47	32.86	0.00	1.86	76.4
								410	37.47	33.05	0.03	1.86	77.1

1% Dehydration after 130 minutes

% Dehydrated by the end of the simulation: 2.6%

Winter Ensemble with EAGLE
Warm Environment
Normal Operations

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.2	Initial Flight	200	38.59	36.45	6.23	1.90	96.1
	10	37.11	34.28	0.00	0.00	78.0		205	38.51	35.92	5.64	1.96	98.3
	20	37.28	34.82	0.86	0.01	80.5		210	38.45	35.55	5.06	2.01	95.3
	30	37.41	35.40	0.96	0.03	84.4	Flight to area	215	38.38	35.29	4.61	2.05	93.7
	40	37.49	35.75	1.45	0.06	86.7		220	38.29	35.07	4.23	2.09	92.5
	50	37.57	35.99	1.88	0.09	89.6		225	38.23	34.90	3.92	2.13	91.7
Brief to launch	60	37.64	36.16	2.28	0.13	92.1	On Station	230	38.17	34.75	3.63	2.16	91.1
	70	37.71	36.32	2.76	0.18	94.9		240	38.06	34.56	3.17	2.22	91.0
	80	37.78	36.45	3.25	0.24	97.4		250	37.97	34.40	2.77	2.28	90.4
	90	37.86	36.57	3.76	0.31	99.8		260	37.90	34.29	2.43	2.32	90.1
	100	37.93	36.68	4.30	0.39	102.1		270	37.84	34.23	2.17	2.36	90.0
	110	38.02	36.85	5.06	0.48	104.4		280	37.79	34.19	2.05	2.40	90.0
	120	38.12	36.98	5.84	0.59	105.5		290	37.75	34.18	2.05	2.44	89.8
	130	38.22	37.08	6.59	0.72	106.2	Return to base	300	37.71	34.21	1.50	2.47	88.9
	140	38.33	37.12	7.12	0.86	106.7		305	37.69	34.27	1.07	2.48	88.9
Aircraft	150	38.42	37.14	7.47	1.00	106.8		310	37.68	34.32	1.22	2.50	90.1
Inspection	155	38.49	37.32	9.01	1.09	114.4		315	37.67	34.30	1.84	2.51	90.6
	160	38.57	37.46	10.16	1.18	115.9		320	37.65	34.28	2.00	2.52	89.4
	165	38.67	37.56	11.17	1.29	115.6		325	37.64	34.31	1.49	2.54	88.2
Wait to launch	170	38.77	37.49	11.79	1.41	115.6	Secure/Inspect	330	37.64	34.39	0.95	2.55	88.9
	175	38.87	37.17	9.87	1.54	108.9	Aircraft	335	37.65	34.54	1.22	2.57	94.4
	180	38.88	36.91	8.51	1.63	106.1		340	37.66	34.70	1.60	2.58	95.5
	185	38.84	36.67	7.54	1.71	102.4		345	37.68	34.80	1.89	2.60	95.7
	190	38.77	36.36	6.68	1.78	96.9		350	37.70	34.88	1.91	2.61	95.7
	195	38.69	36.03	5.96	1.84	92.5	Debrief	360	37.69	34.54	0.84	2.64	81.7
Close Canopy	196	38.65	36.02	6.14	1.85	93.3		370	37.67	34.23	1.73	2.66	83.1
	197	38.63	36.16	6.05	1.86	94.1		380	37.63	34.12	0.27	2.68	82.1
	198	38.62	36.27	6.06	1.87	94.1		390	37.60	33.86	0.61	2.70	80.2
	199	38.60	36.37	6.20	1.89	95.1		400	37.57	33.69	1.08	2.71	81.7
								410	37.54	33.61	0.00	2.72	81.2

1% Dehydration after 130 minutes
3% Dehydration after 230 minutes
% Dehydrated by the end of the simulation: 3.8%

Winter Ensemble with EAGLE
Hot Environment
Normal Operations

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	68.2	Initial Flight	200	38.91	37.65	9.82	2.25	106.2
	10	37.11	34.28	0.00	0.00	78.0		205	38.86	36.81	8.65	2.35	108.8
	20	37.28	34.82	0.86	0.01	80.5		210	38.81	36.39	7.69	2.43	104.0
	30	37.41	35.40	0.96	0.03	84.4	Flight to area	215	38.75	36.11	7.00	2.50	100.6
	40	37.49	35.75	1.45	0.06	86.7		220	38.65	35.89	6.44	2.56	98.1
	50	37.57	35.99	1.88	0.09	89.6		225	38.58	35.72	5.98	2.62	96.7
Brief to launch	60	37.64	36.16	2.28	0.13	92.1	On Station	230	38.51	35.58	5.57	2.68	95.6
	70	37.71	36.32	2.76	0.18	94.9		240	38.36	35.39	4.91	2.78	94.7
	80	37.78	36.45	3.25	0.24	97.4		250	38.25	35.26	4.36	2.86	93.9
	90	37.86	36.57	3.76	0.31	99.8		260	38.15	35.19	3.92	2.94	93.4
	100	37.93	36.68	4.30	0.39	102.1		270	38.07	35.16	3.57	3.01	93.1
	110	38.02	36.85	5.06	0.48	104.4		280	38.00	35.17	3.30	3.07	93.1
	120	38.12	36.98	5.84	0.59	105.5		290	37.95	35.22	3.10	3.13	93.3
	130	38.22	37.08	6.59	0.72	106.2	Return to base	300	37.90	35.30	2.97	3.19	93.7
	140	38.33	37.12	7.12	0.86	106.7		305	37.88	35.33	2.91	3.22	93.2
Aircraft	150	38.42	37.14	7.47	1.00	106.8		310	37.87	35.37	2.88	3.24	93.4
Inspection	155	38.51	37.82	11.05	1.07	114.8		315	37.86	35.41	2.86	3.27	93.7
	160	38.64	38.12	14.05	1.20	113.9		320	37.85	35.46	2.85	3.30	94.0
	165	38.83	38.35	16.52	1.37	113.7		325	37.84	35.51	2.85	3.32	94.4
Wait to launch	170	39.04	38.50	17.64	1.56	114.1	Secure/Inspect	330	37.84	35.56	2.87	3.35	94.7
	175	39.27	37.56	14.91	1.76	110.8	Aircraft	335	37.87	37.08	5.46	3.39	110.2
	180	39.32	37.16	11.55	1.89	109.7		340	37.98	37.51	8.48	3.46	115.0
	185	39.27	36.87	9.71	2.00	104.8		345	38.16	37.69	10.89	3.56	114.3
	190	39.17	36.49	8.49	2.09	98.1		350	38.37	37.84	12.80	3.69	113.9
	195	39.05	36.10	7.53	2.16	92.9	Debrie	360	38.57	35.72	5.55	3.86	94.3
Close Canopy	196	38.99	36.25	8.10	2.18	95.1		370	38.43	34.44	4.01	3.95	84.8
	197	38.97	36.75	8.14	2.19	97.9		380	38.25	33.58	3.13	4.01	82.3
	198	38.94	37.14	8.56	2.21	100.3		390	38.10	33.01	2.33	4.05	81.5
	199	38.93	37.44	9.24	2.23	103.8		400	37.97	32.50	1.77	4.09	78.3
								410	37.89	32.10	1.65	4.12	77.2

1% Dehydration after 130 minutes
3% Dehydration after 196 minutes
% Dehydrated by the end of the simulation: 5.7%

Summer EAGLE Ensemble
Cool Environment
Normal Operations

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.2	Initial Flight	200	37.67	35.03	1.54	0.60	84.4
	10	37.11	34.35	0.00	0.00	79.0		205	37.66	35.03	1.54	0.62	90.8
	20	37.28	34.79	1.03	0.01	82.6		210	37.65	35.05	1.49	0.63	90.7
	30	37.40	35.27	0.54	0.03	82.8	Flight to area	215	37.64	35.05	1.49	0.65	90.8
	40	37.48	35.43	1.35	0.05	85.2		220	37.63	35.04	1.49	0.66	90.8
	50	37.54	35.58	1.34	0.08	86.3		225	37.63	35.04	1.48	0.68	90.7
Brief to launch	60	37.58	35.65	1.50	0.11	86.9	On Station	230	37.62	35.04	1.47	0.69	90.8
	70	37.61	35.71	1.64	0.14	87.6		240	37.62	35.14	1.52	0.72	91.8
	80	37.64	35.75	1.75	0.17	88.0		250	37.61	35.21	1.57	0.75	92.1
	90	37.66	35.78	1.84	0.21	88.3		260	37.61	35.27	1.63	0.78	92.5
	100	37.68	35.79	1.92	0.24	88.4		270	37.62	35.31	1.69	0.81	92.7
	110	37.69	35.81	1.98	0.28	88.6		280	37.62	35.34	1.73	0.84	92.9
	120	37.70	35.82	2.04	0.32	88.7		290	37.63	35.36	1.77	0.88	93.1
	130	37.71	35.83	2.09	0.36	88.8	Return to base	300	37.63	35.38	1.80	0.91	93.2
	140	37.72	35.84	2.14	0.40	88.9		305	37.64	35.38	1.80	0.93	92.4
Aircraft	150	37.73	35.85	2.18	0.44	89.0		310	37.64	35.38	1.82	0.95	92.4
Inspection	155	37.74	35.23	2.01	0.46	97.2		315	37.64	35.39	1.83	0.97	92.5
	160	37.76	34.87	1.79	0.48	95.9		320	37.65	35.39	1.84	0.98	92.5
	165	37.76	34.64	1.65	0.50	95.0		325	37.65	35.40	1.85	1.00	92.6
Wait to launch	170	37.76	34.47	1.53	0.51	94.4	Secure/Inspect	330	37.65	35.40	1.86	1.02	92.6
	175	37.74	34.92	1.22	0.53	82.4	Aircraft	335	37.67	34.92	1.65	1.04	95.0
	180	37.72	35.18	1.59	0.54	84.8		340	37.69	34.70	1.52	1.05	94.8
	185	37.70	35.26	1.81	0.56	84.1		345	37.70	34.56	1.49	1.07	94.5
	190	37.69	35.36	1.49	0.57	83.8		350	37.71	34.45	1.42	1.08	94.1
	195	37.68	35.43	1.62	0.59	85.2	Debrief	360	37.68	35.28	1.56	1.11	84.9
Close Canopy	196	37.68	35.38	1.54	0.59	84.5		370	37.67	35.51	1.56	1.14	84.6
	197	37.68	35.29	1.70	0.59	85.2		380	37.66	35.59	1.73	1.17	85.9
	198	37.68	35.21	1.49	0.60	85.1		390	37.66	35.68	1.81	1.20	86.8
	199	37.67	35.12	1.42	0.60	84.1		400	37.67	35.74	1.89	1.24	87.5
								410	37.68	35.79	1.98	1.28	88.1

1% Dehydration after 240 minutes

% Dehydrated by the end of the simulation: 1.8%

Summer EAGLE Ensemble
Warm Environment
Normal Operations

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.1	Initial Flight	200	38.05	36.74	4.95	0.84	102.8
	10	37.11	34.35	0.00	0.00	79.0		205	38.08	36.65	5.12	0.89	107.2
	20	37.28	34.79	1.03	0.01	82.6		210	38.10	36.64	5.21	0.94	107.0
	30	37.40	35.27	0.54	0.03	82.8	Flight to area	215	38.12	36.65	5.33	0.99	107.1
	40	37.48	35.43	1.35	0.05	85.2		220	38.15	36.67	5.46	1.05	107.3
	50	37.54	35.58	1.34	0.08	86.3		225	38.17	36.68	5.59	1.10	107.5
Brief to launch	60	37.58	35.65	1.50	0.11	86.9	On Station	230	38.19	36.68	5.69	1.16	107.6
	70	37.61	35.71	1.64	0.14	87.6		240	38.23	36.64	5.73	1.27	107.5
	80	37.64	35.75	1.75	0.17	88.0		250	38.25	36.50	5.52	1.38	106.3
	90	37.66	35.78	1.84	0.21	88.3		260	38.24	36.18	4.98	1.48	102.6
	100	37.68	35.79	1.92	0.24	88.4		270	38.19	35.92	4.43	1.57	99.2
	110	37.69	35.81	1.98	0.28	88.6		280	38.13	35.64	3.95	1.65	96.8
	120	37.70	35.82	2.04	0.32	88.7		290	38.06	35.39	3.49	1.72	94.9
	130	37.71	35.83	2.09	0.36	88.8	Return to base	300	37.99	35.18	3.12	1.79	93.6
	140	37.72	35.84	2.14	0.40	88.9		305	37.95	35.08	2.93	1.81	92.4
Aircraft	150	37.73	35.85	2.18	0.44	89.0		310	37.93	34.99	2.78	1.84	92.0
Inspection	155	37.75	36.10	2.97	0.47	102.3		315	37.90	34.88	2.63	1.87	91.6
	160	37.79	36.31	3.52	0.50	105.6		320	37.88	34.78	2.49	1.89	91.2
	165	37.84	36.49	4.09	0.54	108.4		325	37.85	34.70	2.36	1.91	90.9
Wait to launch	170	37.91	36.63	4.74	0.58	110.3	Secure/Inspect	330	37.83	34.65	2.25	1.93	90.7
	175	37.99	36.57	4.30	0.63	100.7	Aircraft	335	37.82	34.67	2.38	1.95	95.8
	180	38.02	36.51	4.19	0.67	99.1		340	37.83	34.79	2.42	1.98	96.4
	185	38.03	36.49	4.16	0.71	98.4		345	37.83	34.84	2.42	2.00	96.5
	190	38.04	36.47	4.14	0.75	97.8		350	37.84	34.88	2.42	2.02	96.7
	195	38.05	36.46	4.14	0.79	97.6	Debrief	360	37.82	34.56	1.62	2.06	82.5
Close Canopy	196	38.05	36.47	4.46	0.80	99.1		370	37.77	34.29	1.37	2.09	84.2
	197	38.05	36.56	4.56	0.81	100.7		380	37.72	33.96	1.03	2.11	80.6
	198	38.05	36.64	4.64	0.82	101.3		390	37.68	33.76	1.44	2.13	82.9
	199	38.05	36.70	4.80	0.83	102.2		400	37.64	33.64	0.16	2.15	81.2
								410	37.60	33.41	0.90	2.16	80.4

1% Dehydration after 185 minutes
3% Dehydration after 410 minutes
% Dehydrated by the end of the simulation: 3.0%

Summer EAGLE Ensemble
Hot Environment
Normal Operations

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	68.2	Initial Flight	200	38.58	37.71	10.07	1.23	110.2
	10	37.11	34.35	0.00	0.00	79.0		205	38.64	37.21	9.33	1.33	112.4
	20	37.28	34.79	1.03	0.01	82.6		210	38.68	37.01	8.75	1.42	111.1
	30	37.40	35.27	0.54	0.03	82.8	Flight to area	215	38.69	36.89	8.19	1.51	110.1
	40	37.48	35.43	1.35	0.05	85.3		220	38.68	36.67	7.57	1.59	108.4
	50	37.54	35.58	1.34	0.08	86.3		225	38.65	36.51	7.06	1.66	106.5
Brief to launch	60	37.58	35.65	1.50	0.11	86.9	On Station	230	38.61	36.30	6.53	1.73	103.7
	70	37.61	35.71	1.64	0.14	87.6		240	38.49	36.04	5.70	1.85	99.9
	80	37.64	35.75	1.75	0.17	88.0		250	38.37	35.80	5.00	1.95	97.2
	90	37.66	35.78	1.84	0.21	88.3		260	38.26	35.69	4.53	2.04	96.1
	100	37.68	35.79	1.92	0.24	88.4		270	38.16	35.60	4.13	2.12	95.3
	110	37.69	35.81	1.98	0.28	88.6		280	38.08	35.51	3.78	2.19	94.8
	120	37.70	35.82	2.04	0.32	88.7		290	38.02	35.43	3.47	2.26	94.2
	130	37.71	35.83	2.09	0.36	88.8	Return to base	300	37.96	35.36	3.22	2.33	93.9
	140	37.72	35.84	2.14	0.40	88.9		305	37.93	35.32	3.08	2.35	93.0
Aircraft	150	37.73	35.85	2.18	0.44	89.0		310	37.91	35.29	2.98	2.38	92.9
Inspection	155	37.76	36.82	4.29	0.48	109.0		315	37.89	35.27	2.88	2.41	92.8
	160	37.85	37.25	6.45	0.53	112.9		320	37.88	35.26	2.79	2.44	92.7
	165	38.00	37.50	8.65	0.61	115.1		325	37.86	35.25	2.72	2.46	92.7
Wait to launch	170	38.18	37.71	10.88	0.71	114.2	Secure/Inspect	330	37.84	35.24	2.65	2.49	92.6
	175	38.40	37.26	9.21	0.82	110.1	Aircraft	335	37.86	37.15	5.51	2.53	110.1
	180	38.49	37.14	8.29	0.91	107.8		340	37.97	37.54	8.40	2.60	115.0
	185	38.54	37.08	7.83	0.99	106.6		345	38.15	37.68	10.76	2.70	114.4
	190	38.56	37.03	7.48	1.07	105.8		350	38.36	37.80	12.46	2.82	114.1
	195	38.57	36.93	7.10	1.14	104.8	Debrief	360	38.51	35.33	4.83	2.97	89.6
Close Canopy	196	38.56	37.14	7.79	1.16	105.7		370	38.35	34.00	3.54	3.04	83.3
	197	38.56	37.39	8.41	1.17	106.9		380	38.18	33.12	2.69	3.09	81.2
	198	38.57	37.54	9.02	1.19	108.2		390	38.04	32.66	2.42	3.13	79.7
	199	38.57	37.64	9.57	1.21	109.4		400	37.93	32.33	1.51	3.16	78.2
								410	37.85	31.98	1.31	3.18	77.0

1% Dehydration after 170 minutes
3% Dehydration after 280 minutes
% Dehydrated by the end of the simulation: 4.4%

Summer ATAGS Ensemble
Cool Environment
Normal Operations

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	68.2	Initial Flight	200	37.76	35.69	2.18	0.71	87.7
	10	37.11	34.27	0.00	0.00	79.0		205	37.75	35.71	2.30	0.73	94.0
	20	37.28	34.76	0.92	0.01	81.5		210	37.74	35.73	2.29	0.76	94.0
	30	37.39	35.29	0.51	0.03	83.9	Flight to area	215	37.74	35.74	2.30	0.78	94.0
	40	37.47	35.50	1.29	0.05	84.6		220	37.73	35.74	2.30	0.80	94.0
	50	37.53	35.69	1.37	0.07	86.4		225	37.73	35.74	2.31	0.82	94.1
Brief to launch	60	37.57	35.80	1.55	0.10	87.3	On Station	230	37.73	35.75	2.32	0.84	94.1
	70	37.61	35.90	1.74	0.14	88.3		240	37.73	35.76	2.35	0.89	94.9
	80	37.65	35.97	1.90	0.17	89.0		250	37.73	35.77	2.37	0.93	95.0
	90	37.67	36.02	2.04	0.21	89.6		260	37.73	35.78	2.39	0.98	95.1
	100	37.70	36.06	2.18	0.25	90.1		270	37.73	35.78	2.40	1.02	95.1
	110	37.72	36.10	2.31	0.30	90.6		280	37.73	35.78	2.42	1.07	95.2
	120	37.74	36.13	2.43	0.34	91.0		290	37.73	35.70	2.35	1.12	94.6
	130	37.76	36.17	2.55	0.39	91.5	Return to base	300	37.73	35.65	2.30	1.16	94.3
	140	37.78	36.20	2.67	0.44	91.9		305	37.73	35.63	2.26	1.18	93.5
Aircraft	150	37.80	36.28	2.83	0.49	92.7		310	37.73	35.61	2.24	1.20	93.4
Inspection	155	37.82	35.71	2.64	0.52	99.9		315	37.73	35.58	2.22	1.22	93.3
	160	37.84	35.41	2.41	0.54	98.1		320	37.72	35.51	2.17	1.25	93.1
	165	37.84	35.23	2.25	0.57	97.0		325	37.72	35.46	2.13	1.27	92.9
Wait to launch	170	37.83	35.08	2.11	0.59	96.2	Secure/Inspect	330	37.72	35.42	2.09	1.29	92.7
	175	37.81	35.56	1.95	0.60	85.1	Aircraft	335	37.73	34.61	1.73	1.30	94.7
	180	37.79	35.80	2.24	0.62	86.6		340	37.74	34.23	1.49	1.32	94.2
	185	37.78	35.92	2.26	0.65	87.2		345	37.74	33.96	1.36	1.33	93.6
	190	37.77	36.00	2.33	0.67	88.1		350	37.73	33.72	1.27	1.34	93.1
	195	37.77	36.05	2.40	0.69	88.8	Debrief	360	37.70	34.95	1.17	1.37	83.6
Close Canopy	196	37.77	36.01	2.39	0.70	89.1		370	37.66	35.18	1.52	1.39	81.8
	197	37.76	35.93	2.40	0.70	89.3		380	37.65	35.38	1.60	1.42	85.5
	198	37.76	35.84	2.27	0.70	88.9		390	37.64	35.50	1.51	1.45	84.6
	199	37.76	35.76	2.20	0.71	88.1		400	37.64	35.60	1.69	1.49	85.9
								410	37.65	35.69	1.76	1.52	86.6

1% Dehydration after 200 minutes

% Dehydrated by the end of the simulation: 2.1%

Summer ATAGS Ensemble
Warm Environment
Normal Operations

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.1	Initial Flight	200	38.31	37.16	6.80	1.04	106.3
	10	37.11	34.27	0.00	0.00	79.0		205	38.34	37.00	6.93	1.11	109.8
	20	37.28	34.76	0.92	0.01	81.5		210	38.37	36.99	6.97	1.18	109.5
	30	37.39	35.29	0.51	0.03	83.8	Flight to area	215	38.40	36.98	7.05	1.25	109.6
	40	37.47	35.50	1.29	0.05	84.6		220	38.43	36.91	6.93	1.32	109.2
	50	37.53	35.69	1.37	0.07	86.4		225	38.44	36.82	6.75	1.39	108.6
Brief to launch	60	37.57	35.80	1.55	0.10	87.3	On Station	230	38.44	36.76	6.58	1.46	108.0
	70	37.61	35.90	1.74	0.14	88.3		240	38.42	36.57	6.06	1.58	105.9
	80	37.65	35.97	1.90	0.17	89.0		250	38.36	36.30	5.42	1.69	102.2
	90	37.67	36.02	2.04	0.21	89.6		260	38.29	36.04	4.87	1.79	99.5
	100	37.70	36.06	2.18	0.25	90.1		270	38.20	35.58	4.13	1.88	95.9
	110	37.72	36.10	2.31	0.30	90.6		280	38.11	35.28	3.58	1.95	93.8
	120	37.74	36.13	2.43	0.34	91.0		290	38.02	34.89	3.08	2.01	92.3
	130	37.76	36.17	2.55	0.39	91.5	Return to base	300	37.94	34.64	2.69	2.06	91.4
	140	37.78	36.20	2.67	0.44	91.9		305	37.91	34.51	2.51	2.09	90.4
Aircraft	150	37.80	36.28	2.83	0.49	92.7		310	37.88	34.43	2.36	2.11	90.1
Inspection	155	37.83	36.55	3.90	0.53	106.8		315	37.85	34.35	2.23	2.13	89.9
	160	37.89	36.77	4.77	0.57	110.4		320	37.83	34.28	2.11	2.15	89.6
	165	37.97	36.90	5.59	0.62	111.7		325	37.80	34.21	1.99	2.17	89.4
Wait to launch	170	38.06	37.01	6.39	0.68	112.5	Secure/Inspect	330	37.78	34.15	1.88	2.19	89.2
	175	38.17	36.96	5.95	0.75	105.2	Aircraft	335	37.77	34.10	1.95	2.20	94.2
	180	38.22	36.94	5.84	0.81	104.7		340	37.78	34.16	1.97	2.22	94.5
	185	38.25	36.93	5.85	0.86	104.3		345	37.78	34.22	1.95	2.24	94.6
	190	38.27	36.92	5.85	0.92	104.2		350	37.78	34.24	1.90	2.25	94.6
	195	38.29	36.89	5.78	0.98	103.6	Debrief	360	37.75	33.91	0.81	2.28	80.7
Close Canopy	196	38.29	36.92	6.09	0.99	104.5		370	37.71	33.49	1.48	2.30	81.0
	197	38.30	37.01	6.26	1.00	105.2		380	37.66	33.22	0.76	2.32	81.6
	198	38.30	37.08	6.43	1.02	105.6		390	37.63	32.91	0.28	2.33	78.8
	199	38.30	37.12	6.63	1.03	106.0		400	37.61	32.65	0.59	2.34	77.7
								410	37.60	32.46	0.57	2.35	77.7

1% Dehydration after 170 minutes
3% Dehydration after 325 minutes
% Dehydrated by the end of the simulation: 3.2%

Summer ATAGS Ensemble
Hot Environment
Normal Operations

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.2	Initial Flight	200	38.75	37.96	11.47	1.43	110.3
	10	37.11	34.27	0.00	0.00	79.0		205	38.81	37.37	10.59	1.55	113.8
	20	37.28	34.76	0.92	0.01	81.5		210	38.85	37.25	10.03	1.65	112.5
	30	37.39	35.29	0.51	0.03	83.8	Flight to area	215	38.86	37.14	9.52	1.75	111.5
	40	37.47	35.50	1.29	0.05	84.6		220	38.86	36.99	8.89	1.85	110.4
	50	37.53	35.69	1.37	0.07	86.4		225	38.83	36.84	8.34	1.93	109.0
Brief to launch	60	37.57	35.80	1.55	0.10	87.3	On Station	230	38.79	36.71	7.81	2.01	107.3
	70	37.61	35.90	1.74	0.14	88.3		240	38.68	36.50	7.02	2.16	104.6
	80	37.65	35.97	1.90	0.17	89.0		250	38.57	36.34	6.41	2.29	102.4
	90	37.67	36.02	2.04	0.21	89.6		260	38.47	36.18	5.82	2.41	100.5
	100	37.70	36.06	2.18	0.25	90.1		270	38.38	36.09	5.37	2.52	99.5
	110	37.72	36.10	2.31	0.30	90.6		280	38.30	36.03	5.02	2.62	98.9
	120	37.74	36.13	2.43	0.34	91.0		290	38.23	35.97	4.70	2.71	98.5
	130	37.76	36.17	2.55	0.39	91.5	Return to base	300	38.17	35.93	4.44	2.80	98.1
	140	37.78	36.20	2.67	0.44	91.9		305	38.15	35.89	4.30	2.84	97.3
Aircraft	150	37.80	36.28	2.83	0.49	92.7		310	38.12	35.87	4.19	2.88	97.1
Inspection	155	37.85	37.11	5.37	0.53	111.1		315	38.10	35.85	4.09	2.92	97.1
	160	37.96	37.45	7.86	0.60	114.8		320	38.09	35.84	4.00	2.96	97.0
	165	38.12	37.69	10.28	0.69	114.3		325	38.07	35.83	3.92	3.00	96.9
Wait to launch	170	38.32	37.93	12.61	0.81	113.8	Secure/Inspect	330	38.05	35.83	3.85	3.04	96.9
	175	38.57	37.48	11.06	0.95	109.9	Aircraft	335	38.08	37.55	7.90	3.09	113.3
	180	38.67	37.38	9.90	1.06	109.9		340	38.22	37.85	11.53	3.20	114.0
	185	38.73	37.29	9.26	1.16	108.2		345	38.43	38.02	14.00	3.33	113.6
	190	38.75	37.16	8.59	1.25	106.9		350	38.67	37.91	15.57	3.49	113.8
	195	38.74	37.01	7.89	1.33	105.4	Debrief	360	38.85	35.90	6.77	3.70	95.5
Close Canopy	196	38.74	37.28	8.57	1.35	106.2		370	38.65	34.59	5.00	3.80	85.3
	197	38.73	37.59	9.31	1.36	107.4		380	38.44	33.65	3.96	3.88	82.7
	198	38.74	37.77	10.09	1.38	109.0		390	38.25	32.94	3.60	3.93	82.1
	199	38.74	37.88	10.81	1.41	110.1		400	38.11	32.57	2.43	3.98	79.5
								410	38.00	32.20	1.78	4.01	77.8

1% Dehydration after 165 minutes
3% Dehydration after 240 minutes
% Dehydrated by the end of the simulation: 5.5%

Summer ATAGS with additional arm coverage Ensemble
Cool Environment
Normal Operations

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.1	Initial Flight	200	37.92	35.72	2.83	0.99	89.0
	10	37.11	34.28	0.00	0.00	79.0		205	37.90	35.68	2.87	1.02	94.4
	20	37.28	34.82	0.98	0.01	81.7		210	37.88	35.63	2.74	1.05	93.8
	30	37.40	35.43	0.64	0.03	84.3	Flight to area	215	37.86	35.56	2.64	1.07	93.4
	40	37.48	35.72	1.34	0.05	85.8		220	37.83	35.50	2.54	1.10	93.0
	50	37.54	35.93	1.63	0.08	88.1		225	37.82	35.43	2.44	1.12	92.7
Brief to launch	60	37.60	36.06	1.90	0.12	89.6	On Station	230	37.80	35.32	2.33	1.14	92.2
	70	37.65	36.16	2.18	0.16	91.1		240	37.77	35.23	2.18	1.19	92.4
	80	37.70	36.24	2.43	0.20	92.3		250	37.74	35.14	2.03	1.22	92.0
	90	37.74	36.30	2.68	0.25	93.4		260	37.71	34.99	1.86	1.26	91.4
	100	37.78	36.36	2.91	0.31	94.3		270	37.69	34.87	1.71	1.29	91.0
	110	37.82	36.42	3.15	0.37	95.2		280	37.67	34.63	1.53	1.32	90.5
	120	37.86	36.51	3.42	0.43	96.3		290	37.65	34.45	1.36	1.35	89.9
	130	37.90	36.61	3.83	0.50	98.6	Return to base	300	37.63	34.30	1.22	1.37	89.5
	140	37.95	36.69	4.22	0.58	100.4		305	37.61	34.22	1.14	1.38	88.6
Aircraft	150	38.01	36.73	4.52	0.67	101.4		310	37.61	34.16	1.08	1.39	88.4
Inspection	155	38.04	36.11	4.02	0.71	104.8		315	37.60	34.10	1.03	1.40	88.3
	160	38.05	35.82	3.63	0.75	101.6		320	37.59	34.05	1.00	1.41	88.2
	165	38.05	35.62	3.34	0.78	99.7		325	37.58	34.00	0.97	1.42	88.1
Wait to launch	170	38.03	35.45	3.11	0.81	98.4	Secure/Inspect	330	37.58	33.95	0.94	1.43	87.9
	175	37.99	36.00	3.08	0.84	88.5	Aircraft	335	37.59	32.27	0.37	1.44	87.4
	180	37.96	36.21	3.27	0.87	90.3		340	37.62	31.45	0.13	1.44	85.2
	185	37.95	36.29	3.33	0.90	91.4		345	37.64	30.93	0.00	1.44	83.7
	190	37.94	36.31	3.34	0.93	92.1		350	37.65	30.59	0.00	1.44	82.7
	195	37.93	36.31	3.36	0.96	92.4	Debrief	360	37.61	32.71	0.00	1.45	74.9
Close Canopy	196	37.93	36.21	3.32	0.97	92.5		370	37.55	33.31	0.06	1.45	75.9
	197	37.93	36.06	3.20	0.98	92.1		380	37.52	33.62	0.33	1.45	77.4
	198	37.93	35.93	2.99	0.98	90.9		390	37.50	33.90	0.40	1.46	78.6
	199	37.93	35.81	2.89	0.99	89.7		400	37.49	34.15	0.47	1.47	80.1
								410	37.48	34.34	0.55	1.48	79.7

1% Dehydration after 155 minutes

% Dehydrated by the end of the simulation: 2.0%

Summer ATAGS with additional arm coverage Ensemble
Warm Environment
Normal Operations

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.1	Initial Flight	200	38.50	37.25	7.70	1.39	106.5
	10	37.11	34.28	0.00	0.00	79.0		205	38.51	36.86	7.08	1.47	109.0
	20	37.28	34.82	0.98	0.01	81.7		210	38.50	36.75	6.71	1.54	107.5
	30	37.40	35.43	0.64	0.03	84.3	Flight to area	215	38.49	36.61	6.37	1.60	106.1
	40	37.48	35.72	1.34	0.05	85.8		220	38.45	36.50	6.08	1.66	104.4
	50	37.54	35.93	1.63	0.08	88.1		225	38.42	36.39	5.79	1.72	103.0
Brief to launch	60	37.60	36.06	1.90	0.12	89.6	On Station	230	38.39	36.21	5.42	1.78	101.0
	70	37.65	36.16	2.18	0.16	91.1		240	38.29	35.90	4.73	1.87	97.9
	80	37.70	36.24	2.43	0.20	92.3		250	38.20	35.55	4.13	1.95	95.5
	90	37.74	36.30	2.68	0.25	93.4		260	38.11	35.27	3.64	2.03	94.0
	100	37.78	36.36	2.91	0.31	94.3		270	38.02	35.07	3.23	2.09	92.9
	110	37.82	36.42	3.15	0.37	95.2		280	37.95	34.87	2.86	2.14	92.0
	120	37.86	36.51	3.42	0.43	96.3		290	37.89	34.69	2.53	2.19	91.3
	130	37.90	36.61	3.83	0.50	98.6	Return to base	300	37.83	34.53	2.25	2.24	90.8
	140	37.95	36.69	4.22	0.58	100.4		305	37.81	34.43	2.10	2.26	89.8
Aircraft	150	38.01	36.73	4.52	0.67	101.4		310	37.79	34.30	1.97	2.27	89.6
Inspection	155	38.06	36.96	5.89	0.72	111.6		315	37.77	34.20	1.86	2.29	89.4
	160	38.14	37.11	6.91	0.78	112.8		320	37.75	34.12	1.76	2.31	89.2
	165	38.23	37.22	7.86	0.86	113.9		325	37.73	34.03	1.68	2.32	89.0
Wait to launch	170	38.34	37.27	8.61	0.94	114.7	Secure/Inspect	330	37.71	33.94	1.60	2.34	88.7
	175	38.45	37.16	7.84	1.03	107.2	Aircraft	335	37.71	33.67	1.65	2.35	93.4
	180	38.50	37.10	7.49	1.11	106.2		340	37.72	33.65	1.64	2.36	93.4
	185	38.52	37.06	7.22	1.18	105.6		345	37.72	33.65	1.55	2.38	93.2
	190	38.53	36.97	6.91	1.26	104.8		350	37.73	33.64	1.38	2.39	93.1
	195	38.52	36.82	6.46	1.32	103.0	Debrief	360	37.70	33.49	0.76	2.41	82.0
Close Canopy	196	38.51	36.92	6.76	1.34	103.8		370	37.66	33.13	0.17	2.43	80.2
	197	38.51	37.07	7.04	1.35	104.8		380	37.63	32.77	0.70	2.44	77.9
	198	38.50	37.15	7.28	1.36	105.5		390	37.61	32.53	0.72	2.45	77.8
	199	38.50	37.21	7.51	1.38	106.1		400	37.60	32.35	0.31	2.46	77.4
								410	37.58	32.15	0.27	2.47	76.7

1% Dehydration after 155 minutes
3% Dehydration after 290 minutes
% Dehydrated by the end of the simulation: 3.4%

Summer ATAGS with additional arm coverage Ensemble
Hot Environment
Normal Operations

Period	Time	Tre	Tsk	SR	SWT	HR	Period	Time	Tre	Tsk	SR	SWT	HR
Brief	0	37.01	33.60	0.00	0.00	65.1	Initial Flight	200	38.87	38.39	13.07	1.78	110.0
	10	37.11	34.28	0.00	0.00	79.0		205	38.94	37.47	11.75	1.92	114.4
	20	37.28	34.82	0.98	0.01	81.7		210	38.98	37.36	11.01	2.03	113.3
	30	37.40	35.43	0.64	0.03	84.3	Flight to area	215	38.99	37.31	10.64	2.14	112.4
	40	37.48	35.72	1.34	0.05	85.8		220	38.99	37.26	10.37	2.25	112.0
	50	37.54	35.93	1.63	0.08	88.1		225	38.98	37.21	10.05	2.36	111.4
Brief to launch	60	37.60	36.06	1.90	0.12	89.6	On Station	230	38.96	37.18	9.82	2.46	111.0
	70	37.65	36.16	2.18	0.16	91.1		240	38.92	37.14	9.55	2.66	111.0
	80	37.70	36.24	2.43	0.20	92.3		250	38.87	37.08	9.26	2.85	110.7
	90	37.74	36.30	2.68	0.25	93.4		260	38.83	37.02	8.95	3.03	110.4
	100	37.78	36.36	2.91	0.31	94.3		270	38.79	36.97	8.66	3.21	110.1
	110	37.82	36.42	3.15	0.37	95.2		280	38.75	36.92	8.40	3.38	109.8
	120	37.86	36.51	3.42	0.43	96.3		290	38.71	36.87	8.14	3.55	109.5
	130	37.90	36.61	3.83	0.50	98.6	Return to base	300	38.67	36.83	7.92	3.71	109.2
	140	37.95	36.69	4.22	0.58	100.4		305	38.65	36.80	7.75	3.79	108.6
Aircraft	150	38.01	36.73	4.52	0.67	101.4		310	38.64	36.78	7.63	3.87	108.5
Inspection	155	38.07	37.44	7.63	0.73	113.7		315	38.62	36.76	7.52	3.95	108.3
	160	38.21	37.74	10.37	0.82	114.5		320	38.60	36.74	7.42	4.02	108.1
	165	38.39	38.00	12.91	0.94	113.8		325	38.59	36.72	7.32	4.09	107.9
Wait to launch	170	38.60	38.24	15.28	1.09	113.5	Secure/Inspect	330	38.57	36.71	7.22	4.17	107.7
	175	38.85	37.61	12.98	1.26	109.9	Aircraft	335	38.61	38.10	12.41	4.27	114.4
	180	38.94	37.38	11.07	1.39	110.5		340	38.76	38.39	16.04	4.42	113.7
	185	38.97	37.26	9.90	1.49	108.0		345	38.97	38.61	17.64	4.61	113.8
	190	38.95	37.07	8.89	1.59	106.0		350	39.21	38.81	17.64	4.81	114.2
	195	38.90	36.86	8.04	1.67	103.0	Debrief	360	39.45	36.97	11.37	5.12	108.4
Close Canopy	196	38.88	37.29	8.82	1.69	104.6		370	39.23	36.11	8.48	5.32	94.7
	197	38.87	37.77	9.83	1.71	106.6		380	38.95	35.30	6.83	5.46	88.1
	198	38.86	38.07	10.98	1.73	109.0		390	38.70	34.64	5.61	5.57	85.0
	199	38.87	38.26	12.05	1.75	110.2		400	38.49	34.09	4.61	5.65	83.4
								410	38.31	33.67	3.22	5.73	82.9

1% Dehydration after 155 minutes
3% Dehydration after 215 minutes
6% Dehydration after 335 minutes
Threshold for critical loss of CNS function (SWT = 4.5 kg): 340 minutes
% Dehydrated by the end of the simulation: 7.9%

Brooks AFB, San Antonio, TX 78325, ATTN: S. Nunneley 1
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Commanding Officer, US Army Research, Development and Engineering Center, STRNC-ICCC, Natick, MA 01760-5019 ATTN: R.A. Lomba 1
Naval Clothing and Textile Research Facility P.O. Box 59, Natick, MA 01760, ATTN: J. Giblo 1
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Biomedical Engineering & Science Institute, Drexel University, 32nd and Chestnut Sts, Phila., PA 19104, ATTN: S. Dubin	1
Electrical and Computer Engineering Department, Drexel University 32nd and Chestnut Sts, Phila., PA 19104, ATTN: L. Hrebien	1
Commanding Officer, U.S. Air Force School of Aerospace Medicine,	